THE ZOOLOGICAL SOCIETY OF LONDON

Annual Report 1979

The Zoological Society of London was founded in 1826, largely as the result of the energy and initiative of Sir Stamford Raffles, Sir Humphry Davy (President of the Royal Society) and eminent naturalists. It was incorporated by Royal Charter in 1829, its stated purpose being

'the advancement of Zoology and Animal Physiology and the introduction of new and curious subjects of the Animal Kingdom'.

A new Charter was granted to the Society in 1963.

The Society's Gardens in Regent's Park – now known all over the world as the London Zoo – were opened in 1828. A hundred years later the Society acquired and, in 1931 opened, Whipsnade Park, an area of some 500 acres of farm and downland where the rural setting forms a splendid background for animals that are able to roam in large paddocks. Whipsnade Park and the London Zoo are complementary and together house one of the finest and most comprehensive collections of wild animals in the world.

The Society was formed as a scientific society and this remains its prime purpose. Throughout its existence members of its staff, as well as many eminent zoologists and other visiting scientists, have studied material derived from the Collection and have made important contributions to our knowledge of taxonomy, comparative anatomy and physiology, human and veterinary medicine, pathology, ecology and animal behaviour. Research Laboratories and a modern Veterinary Hospital linked with a Pathology Department, which were established between the years 1956 and 1965, have greatly extended the scope of research which can be undertaken and sponsored by the Society.

Scientific meetings are held on the second Tuesday in the months February to June and October to December. At these meetings the results of new research are communicated and discussed, and specimens and films of zoological interest are exhibited. Symposia on special subjects are also arranged. The Society owns one of the finest zoological libraries in the world, which has been built up over the 153 years of its existence.

The Society's publications include:

The *Journal of Zoology* (the *Proceedings of the Society*). Three volumes (12 parts) are published annually containing papers which cover all fields of zoology.

The *Transactions* are published at irregular intervals.

The *Symposia* record the papers read at the Symposia.

The *Zoological Record*, a comprehensive bibliography of zoological literature with subject and systematic indices, is available either as a complete volume or separately in 27 parts dealing with the different animal groups.

The *Nomenclator Zoologicus* contains the names of all the genera and subgenera in zoology from the 10th Edition of Linnaeus 1758 to the end of 1965, with a bibliographical reference to the original description of each. The work contains approximately 280,000 entries and is published in 7 volumes.

The *International Zoo Yearbook*, published annually, provides authoritative information on developments in the zoo world.

Report of the Council

The Council has pleasure in presenting its 151st Annual Report to the Annual General Meeting of the Society to be held on 14th May 1980 at 4.00 pm in the Society's Meeting Room at Regent's Park.

CONTENTS

PATRON: HER MAJESTY THE QUEEN

COUNCIL 1979–1980

President: Professor Lord Zuckerman, OM, KCB, MD, DSc, FRS
Treasurer: Lord Buxton, MC, DL
Secretary: Ronald Henderson Hedley, DSc, PhD, FIBiol
Erasmus D. Barlow, MA, MB, BChir, MRC Psych.
Sir Denis Barnes, KCB
Professor E. J. W. Barrington, MA, DSc, FRS, *Vice-President*
Lord Charteris of Amisfield, PC, GCB, GCVO, OBE, QSO
Professor J. M. Dodd, DSc, FIBiol, FRS, FRSE
David L. Donne
Sir Dudley Forwood, Bt
Miss Barbara M. Gilchrist, PhD
Sir William Henderson, DSc, FRCVS, FIBiol, FRS, FRSE
Sir Terence Morrison-Scott, DSC, DSc, *Vice-President*
Sir Michael Perrin, CBE, FRIC, *Vice-President*
Professor R. V. Short, ScD, FRS
Professor K. Simkiss, PhD, DSc, FIBiol
Sir Eric Smith, CBE, ScD, FRS
C. E. Gordon Smith, CB, MD, FRCP, FRCPath, *Vice-President*
Sir Richard Way, KCB, CBE, *Vice-President*
The Duke of Wellington, MVO, OBE, MC
Sir Gordon Wolstenholme, OBE, FRCP, FIBiol, *Vice-President*

HONORARY FELLOWS

Date of Election

1977 HRH The Prince Philip, Duke of Edinburgh, KG, KT
1971 His Majesty Emperor Hirohito of Japan, KG
1978 Professor W. E. Ankel, 6301 Leihgestern-Mühlberg, Finkenweg 22, West Germany
1975 Professor Jean Anthony
Muséum National d'Histoire Naturelle,
55 rue de Buffon, Paris 53, France
1975 Professor L. D. Brongersma
Rijksmuseum van Natuurlijke Historie, Leiden, Holland
1979 Professor José Carvalho
Museu Nacional, Quinta da Boa Vista,
Rio de Janeiro, Brazil 20940
1955 Dr G. W. Corner
American Philosophical Society, 104 South Fifth Street,
Philadelphia 6, Pennsylvania, USA
1957 Professor Robert Courrier
L'Institut de France (Académie des Sciences),
23 Quai de Conti, Paris 6, France
1945 Monsieur Jean Delacour
Parc Zoologique de Clères, Clères, Rouen, S-M, France
1975 Professor Jean Dorst
Muséum National d'Histoire Naturelle (Mammifères et Oiseaux), 55 rue de Buffon, Paris 53, France
1979 Sir Charles Fleming, FRS
Balivean, 42 Wadestown Road, Wellington, New Zealand
1979 Professor M. S. Ghilarov
Member of the USSR Academy of Sciences,
Institute of Evolutionary Morphology & Ecology of Animals, Moscow 117071, Leninskij Prospekt 33. USSR
1975 Dr Harry Hoogstraal
US Naval Medical Research Unit No 3, c/o Embassy of the USA, Cairo, Egypt
1952 Professor Sven Otto Hörstadius
Zoologiska Institutionen, Uppsala, Sweden
1974 Dr Roger Tory Peterson
Route 4, Box 131 Neck Road, Old Lyme, Connecticut, USA
1947 Professor G. G. Simpson, Department of Geology,
University of Arizona, Tucson, Arizona 85721, USA
1937 Dr E. A. Stensiö
Naturhistoriska Riksmuseum, Stockholm 50, Sweden

Review of the Year

Annual General Meeting

The Annual General Meeting was held on 9th May, with the President, Professor Lord Zuckerman, in the chair. The following members of Council retired: Mr E. Michael Behrens, Lady Daphne Straight and The Hon Sir Ronald Waterhouse (Ordinary Fellows); The Hon Ivor Montagu and Dr C. A. Wright (Scientific Fellows).

The following Fellows were elected Members of Council to fill these vacancies: Dr E. D. Barlow, The Lord Charteris of Amisfield and Mr David Donne (Ordinary Fellows); Sir William Henderson and Professor R. V. Short (Scientific Fellows). The President presented the following awards for contributions to zoology:

The Scientific Medal (awarded to persons under 40 years of age for distinguished work in zoology) to *Dr G. A. Lincoln*, MRC Reproductive Biology Unit, Edinburgh, for his work on the influence of environment on reproductive performance in birds and mammals.

The Thomas Henry Huxley Award (for original work submitted as a doctoral thesis) to *Dr D. W. Macdonald*, University of Oxford, for his thesis 'The behavioural ecology of the Red Fox, *Vulpes vulpes*: a study of social organization and resource exploitation'. The award was a sculpture by Tapio Wirkkala.

The Stamford Raffles Award (awarded to an amateur zoologist for distinguished contributions to zoology) to *Mr Jonathan Kingdon*, for contributions to the study of East African mammals.

The Prince Philip Prize (awarded for an account of practical work involving some aspect of living animals, by a pupil under 19 years of age, in a school in the United Kingdom) to *Andrew Catlin*, University College School, London, for his essay 'A study of dominance hierarchy in the Mongolian gerbil (*Meriones unguiculatus*)'.

The Zoological Society of London Frink Medal for British Zoologists (awarded to zoologists for significant and original contributions to zoology in its wider implications) to *Professor Sir Vincent Wigglesworth, CBE, FRS.*

The Society's Bronze Medal was presented to *Mr S. Morton*, Head Keeper at Regent's Park, for his distinguished service in the Bears Section.

Membership

The following Honorary Fellows were elected:

Professor José Carvalho, Director of the National Museum, Rio de Janeiro, Brazil, for services to entomology and to conservation.

Sir Charles Fleming, FRS, New Zealand Geological Survey, Wellington, New Zealand, for services to paleontology and to conservation.

Professor M. S. Ghilarov, Biological Secretary of the Academy of Sciences USSR, for services to soil ecology and to the International Zoological community.

At the end of the year there were 2,657 Fellows and 4,243 Associates.

Obituary

The Council records with deep regret the death of The Earl Mountbatten of Burma. He had been a Life Fellow since 1925, and had close connections with the Society.

Several other Fellows who had played a prominent part in the affairs of the Society, either as members of Council or as benefactors also died during the course of the year under review. Among them were Dr David Bannerman, Sir Charles Clore, Sir John Cohen, Mr Norman Riley, Mr Whitney Straight and the Marquess of Willingdon. The donations of Sir Charles Clore are commemorated in the Small Mammal House and in the New Lion Terraces, to the cost of which he made a major contribution.

Finance

During the year ordinary expenditure rose by 23 per cent. Admission prices were increased in the Spring and by the end of May attendances had recovered from the adverse effects of the winter months. Admission prices had to be increased again in July to cover the increase in VAT and further wage awards.

At Whipsnade the decline of attendances in recent years has halted, with the number of admissions much the same as in 1978. Attendances for the year at Regent's Park were six per cent less than in 1978 due mainly to a marked decline in the number of visitors in June, July and August. Income from admissions was £200,000 below that anticipated and this resulted in a deficit of £211,000 for the year.

Some urgently needed repairs and work, including the replacement of the heating boilers, was completed, the cost being met from the Repairs and Renewals Reserve.

Grants, Gifts and Donations

Grants totalling £230,275 were received to support the work of the Institute of Zoology. The Council is grateful for this help in maintaining and advancing the Society's research activities, and for the recognition of this aspect of the Society's work. The Council also wishes to place on record its grateful thanks to the Straight Charitable Foundation and Lady Daphne Straight for a gift of £5,000; Mrs Dorothy Rand for $3,000 to improve accommodation for Great Apes; £100 from Mr W. Curtis for a grove of trees on the north bank of the Regent's Canal in memory of his wife; for donations in memory of the late Jonathan Newport; £1,329, the balance of the legacy from Miss E. E. P. Agabeg; £281 from the late Mrs A. M. Dell of South Wootton and £50 from Birkbeck College. Gifts of trees and flowers have also been generously made. Mr M. J. Galsworthy gave shrubs for the north wall of the Clore Pavilion; trees for Regent's Park and Whipsnade were given by the Duke of Wellington and orchids by Mr J. D. Berman.

The Council would also like to thank the Arts Council of Great Britain for a grant and assistance in exhibiting sculpture at Regent's Park; Mr Willi Soukop for the loan of his work 'New Life' and Mr Nicholas Monro for lending his group of sculptures 'Deer Herd'. Mr William Timym added to his previous gifts by donating the painting 'Guy the Gorilla' which now hangs in the forecourt of the Regent Cafeteria.

Once again the Council would like to acknowledge the generous help of Mr W. L. Whitehouse who donated a further £2,640 to pay the balance of the cost of a scialytic lamp for the operating theatre and other equipment for the hospital.

The London Zoo

Visitors during the year: 1,501,000
Visitors to the Aquarium: 454,000

General

The appallingly bad weather of the first few months of the year greatly affected attendances both at Regent's Park and at Whipsnade. Winter conditions were the worst since 1962/3 and in addition to their routine work staff had to cope with tasks such as snow clearing, repairing burst pipes and devising special measures to assure the warmth and shelter of the animals.

In January the Council of the International Union of Directors of Zoological Gardens visited Regent's Park, and in May the Society was host to the Annual Conference of British Zoo Directors. The special London Transport bus service was run again between Baker Street Station and the Zoo, during Easter and the main summer season. As in 1978, a small operating loss was met by the Society. From July until September, as part of the 150th Anniversary celebrations of the London Bus, London Transport ran horse-drawn buses around the Outer Circle of Regent's Park. The route included a stop at the Main Gate, and the horse-drawn buses proved popular with the public, particularly tourists.

A private telephone line between Regent's Park and Whipsnade came into service in October, providing a better link at less cost.

Buildings, Services and Grounds

The main work at Regent's Park during the year was the second phase of the modernization of the area heating system. Two new 2,340 kilowatt boilers were installed, replacing boilers which after more than 30 years' service had reached the end of their safe life. The new system is now fully serviceable. The separate heating plant in the Regent Building was replaced by a new gas-fired boiler. The removal of asbestos insulation from other boilers and heating pipes continued and there is none now considered unsafe.

Detailed planning for two large building projects was carried out by the Architect's Department, in consultation with other staff. The first was the re-design of the Main Gate in order to make it the only public entrance to the Zoo. A new Main Gate would improve facilities for visitors, provide a more imposing and attractive entrance, achieve savings in costs over a period and make for greater security. The second project was the renovation of the kitchens and services of the Regent Restaurant, necessary because of the age of the building and health and safety requirements. It was hoped that both projects could be carried out during the winter of 1979–80. Unexpectedly high tenders and disappointing financial results in 1979 led to the reluctant decision to postpone the reconstruction of the Main Gate. The Regent Restaurant project was, however, approved and the contractors started work shortly before Christmas.

A good deal of routine maintenance work was carried out. The metalwork of the outside enclosures of the Sobell Pavilions for Apes and Monkeys, the cast-iron East Bridge, and the Penguin Pool, were all repainted. Upper mesh panels in the Snowdon Aviary were repaired; the service yard of the Elephant and Rhino Pavilion and two paddocks of the Cotton Terraces were re-surfaced. Also the paddock to be used by the newly-arrived Okapis was fenced to keep the animals away from the moat.

Further inspections by staff Safety Representatives took place in July and August. Several modifications to buildings and installations to meet new safety requirements had to be carried out. These included balustrades, lifts and stairways, such as those on the Mappin Terraces. A new type of 'Danger' sign, in four languages, has been incorporated in the general system of precautionary notices.

During the year the Council invited sculptors to exhibit their works in the Zoo grounds for limited periods. Two sculptors, Willi Soukop and Nicholas Monro, accepted the invitation. A new 'Zoo Trail' called the 'Rare Ones', featuring rare and endangered species, was set up after the success of the first venomous animals 'Trail', introduced in 1977. A leaflet guides visitors round some of the main exhibits.

The Collection

Mammal Section

There were some important additions to the mammal collection. In 1978 the Rotterdam and Antwerp Zoos made public their intention of sending a pair of Okapis to the London Zoo as part of the international zoo breeding programme for this rare species. In June 1979, a male arrived from Rotterdam where it had been born, accompanied by another male, born in the Paris Zoo, which is destined for the Bristol Zoo, which possesses the largest collection of captive Okapis in the world. The Bristol animal will remain with us until it has completed the statutory quarantine requirements of one year. In due course, as part of a separate arrangement on behalf of the Antwerp Zoo, Bristol will send a female Okapi to London.

The Okapi, first described to Western science at a meeting of the Zoological Society of London in 1901 after its discovery the previous year by H. H. (later Sir Harry) Johnston, is a rare animal and its status in its wild habitat in the forests of Eastern Zaire is uncertain. There are some 70 specimens in zoos today, nearly all born in captivity, and the management is co-ordinated by the Antwerp Zoo, which is responsible for the studbook of the species. Only three of the species have been exhibited by the Society in the past.

Another important new acquisition was a group of four young Gaur, a species of wild cattle from India and S.E. Asia, believed to be in danger of extinction in its natural habitat. These animals, all zoo-born in Europe, are on the Cotton Terraces where they replace the Yaks, some of which have gone to Whipsnade to increase the breeding herd. There have been no Gaur in the Society's Collection this century. Other acquisitions include a female Giant Anteater, deposited by the Chester Zoo, to make up a pair, a group of three Gemsbok deposited by Marwell Zoo, a pair of Tasmanian Devils (presented by the Tasmanian Wildlife Service) which went on exhibition in December after six months quarantine, and a pair of Yellow Mongooses, received in November from the Frankfurt Zoo, where they had been born.

A male baby born to 'Lomie' the Gorilla in October 1978 was removed from its mother after three months when it became clear that it was not developing properly. It was then hand-reared by Senior Keeper (now Head Keeper) and Mrs R. Smith in the same way as was 'Lomie's' first infant

'Salome'. After a few months on exhibition in London the infant, named 'Saul', was sent to the Bristol Zoo which, as the home of his father 'Samson', was his rightful owner, under the agreement made between Bristol and London Zoo about disposal of the young born to 'Samson' and 'Lomie'. 'Lomie' has now been transferred to Mr John Aspinall's large collection of Gorillas at Howletts Park in Kent where it is hoped she will mate with one of the two proven breeding males. 'Salome', 'Lomie's' first baby, born in 1976, and her male companion 'Kumba', born in the same year at the Jersey Zoo, remain at Regent's Park and are doing well together.

In order to improve the prospects for further Chimpanzee breeding, the adult male from the Whipsnade group was transferred to London. His place was taken by the young male 'Friday', born in the Sobell Pavilions in 1973, and unrelated to any of the females at Whipsnade.

Two more Mandrill births occurred in the group kept in the Sobell Pavilions, making a total of seven since the group was established in 1972. Births also occurred in the Pig-tailed Macaque and Vervet Monkey colonies. A Long-haired Spider Monkey was born, the first ever in the Collection. Unfortunately it was abandoned by its mother and died despite attempts at hand-rearing.

The high standard of exhibition and management in the Charles Clore Pavilion was maintained. Three of the species of Tamarins and Marmosets continued to breed, including the important Cotton-headed Tamarin species. Other births included ten Sugar Gliders, two Grey Mouse Lemurs, a White-faced Saki Monkey, seven Indian Fruit Bats and a litter of Ruffed Lemurs.

Two of the four Ruffed Lemurs born were hairless, as was the case with one each of the animals of the 1977 and 1978 litters. All these births were the result of a father and daughter pairing. During the year, the father, a specimen of the red form of Ruffed Lemur, of which there are few in zoos, was sent to Duke University in the United States of America, which has a breeding programme of red Ruffed Lemurs.

The ungulates on the Cotton and Mappin Terraces produced the usual number of young animals, including Mouflon, Blackbuck, Markhor, Scimitar-horned Oryx, Guanaco and a Giraffe. All the young born to the Barbary Sheep died at, or soon after, birth. The severe winter conditions might have been responsible but post-natal mortality has always been high among these animals which are the descendants of the original Barbary Sheep that were placed on the Mappin Terraces when they were built in 1913.

Other post-natal casualties of greater importance to the Collection included a Common Waterbuck, the first to be born for many years, a Pudu, a Przewalski's Horse and a Timor Deer. In September two young female Siberian Tigers, which had been deposited by Marwell Zoo and kept at Regent's Park during the summer, were moved to Whipsnade in exchange for a pair of studbook registered Sumatran Tigers, A young female Leopard born in the West Berlin Zoo arrived in June to pair with the male, whose previous mate died in 1978.

A female Californian Sealion was born in June. Sadly the adult female 'Karon', mother of two successfully reared young, died suddenly in May, after the weaning of her last cub, a male born in 1978, which has been accepted into the main adult group. An even greater loss was that of her mate 'Major', on loan from Edinburgh Zoo since 1975 and the father of three cubs born at London Zoo. He died shortly before he was due to be returned.

During the course of the year the Sable Antelope and African Buffalo received in 1978 for 'urban confinement' on behalf of Marwell Zoo, finished their statutory stay at Regent's Park. A pair of Dama Gazelles, also for Marwell, arrived during the year, as did two female Sable Antelope for Mr John Aspinall's Port Lympne Collection.

Measurements of the food intake of certain mammal species at Regent's Park, including Small-Toothed Palm Civet, Indian Grey Mongoose, Fennec Fox, White Rhinoceros and Scimitar-horned Oryx, were made during 1979 on behalf of the Nutrition Sub-Committee of the Animal Health and Welfare Committee.

Dr M. R. Brambell, until recently the Society's Curator of Mammals, and now Director of Chester Zoo, had, for some years, in collaboration with Miss S. J. Mathews, been assembling data relevant to the management of wild animals in captivity. By 1979 'data sheets' for some thirty species of mammals had been prepared. The preparation of the sheets for nine British species was done under a contract with the Nature Conservancy Council.

Overseer J. Lambden and Head Keeper T. Kichenside visited the West Berlin, Rotterdam and Antwerp Zoos in March to study the management of Gaur and Okapi in preparation for the arrival of these animals at Regent's Park. Head Keeper R. Willis (now Overseer) visited Rotterdam with the Curator of Birds to study the arrangements for keeping Kiwis and Tasmanian Devils.

Bird Section

The breeding season was significantly later probably because of the prolonged cold weather of the spring, and the number of infertile eggs or embryos dead in the shell was higher than average. Many species did not breed at all. Breeding in some common species was also deliberately curtailed because of the difficulty in disposing of surplus young. Even so, the total number of individual birds reared successfully in 1979 was about the same as in 1978.

Two Night Herons were reared, one by the parents in the Snowdon Aviary, and one, which fell out of an early nest, by keeper staff. Five species of owls were bred, including three Snowy Owls from a pair consisting of a male, in the Collection since 1950, and a female acquired in 1977, a Burrowing Owl and two Abyssinian Spotted Eagle Owls. The Tarictic Hornbills produced another two young (male and female); the Collection has seven of this rarely bred species. The Red-billed Hornbills reared three young successfully, and the Scarlet Ibis hatched two, though neither survived.

The nesting and rearing of Plum-headed Parakeets and Indian-Ring-necked Parakeets, although relatively common birds, is an achievement, since it is only in recent years that breeding has taken place in the Parrot House, following the establishment of compatible pairs and improvements to the aviaries.

Four nests were built in the Abdim's Stork colony, and eggs were laid in at least three, from which two young have been reared by the parents. These are second generation captive birds whose parents were bred in the Collection at Tel-Aviv University. Two Condor eggs (two clutches, a month apart)

were taken to be incubated but neither hatched. There was no development in the first egg, in which a hairline crack was found. The second contained a fully-fledged embryo which, for no obvious reason, died just before hatching.

In the management of the Collection increasing recourse is being made to the artificial incubation of eggs, and the hand-rearing of young.

Unfortunately we do not yet have information about the precise requirements for incubation in many species (e.g. temperature and humidity) nor is enough known about the nutritional requirements and feeding behaviour of the young. For some species there is also the problem of imprinting brought about by hand-rearing, and the subsequent behaviour of individual birds when put back with their own species. Nevertheless, there are considerable advantages to artificial breeding. It reduces vulnerability to vandals and egg thieves, and it can increase the number of young produced, for, by removing the eggs during the time of laying, many species will continue to produce eggs above the normal clutch size, or produce a second or even a third clutch. By experimenting with different incubation temperatures and humidities, and by using various rearing techniques, a number of comparatively difficult species have been successfully reared, including Ringed Plover, Ruff and Sacred Ibis. Birds brought into the Collection included a female Griffon Vulture, which has joined the single male, two Elliot's Pheasants, a Stanley Crane, Dusky Lories, Sun Conures, Brown Violet-eared Hummingbirds, Buff-tailed Coronet Hummingbirds, Tanagers, Sugar-birds, and a large group of Wattled Starlings.

Aquarium

A new reserve marine circulation has been built to accommodate newly arrived fishes and invertebrates.

Some exhibition tanks in the Sea-water Hall have been completely rebuilt to give greater space.

The relatively small number of acquisitions reflects the satisfactory conditions in both freshwater and sea-water tanks. Interesting arrivals have included Moray Eels, South American Lungfish, Electric Catfish, Remora and Hawksbill Turtle.

Insect House

Additions during the year included Scorpions, Millipedes, Centipedes, Bird-eating Spiders and Tarantulas, and Chinese Oak Silk Moth larvae.

Numerous invertebrates have bred, including Black Widow Spider, Bird-eating Spider, Swallowtail Butterfly, Robin Silk Moth, American Moon Moth and several species of stick-insect.

The breeding of locusts (up to 5,000 per week) has continued satisfactorily. These are used as food for mammals, birds and reptiles.

Reptile House

A consignment of over 70 reptiles was sent to the Peking Zoological Gardens as stock for a new Reptile House. In exchange the Society received three Chinese Alligators, a rare species. Four Crocodilians were presented to Barcelona Zoo.

Eight Black Mambas were hatched, from eggs laid in the Reptile House, after an incubation period of 100 days. Other hatchings included seven Fence Lizards, eight African House Snakes and one Leopard Ground Gecko. Births included eight Short-necked Skinks, 20 Boa Constrictors and four Western Diamond-back Rattlesnakes. The most notable arrivals included two baby Giant Tortoises, aged approximately six months, from Frigate Island in the Seychelles, two female Yellow Anacondas as mates for the male already with the Collection, and a pair of Matamata Terrapins.

Whipsnade Park

Visitors during the year: 401,000
Cars brought into the park: 46,000

General

Whipsnade was badly affected by the adverse weather conditions, and ordinary day-to-day work had to be neglected in favour of clearing snow, gritting and sanding roads and paths, repairing burst pipes, providing additional shelter for stock and putting out feed for free-running animals such as the Wallabies.

Improvements to the Elephant exhibit and the Picnic Shelter on the Downs were the only building projects of any significance carried out during the year. The inside walls of the four Elephant stables, designed by Lubetkin in 1935, were completely cleaned by sand-blasting and re-painted with epoxy paint, which should ensure easier cleaning. The holding yard outside the stables was re-surfaced with concrete and the drainage and water supply systems improved.

The Picnic Shelter on the Downs, built in 1967, had proved difficult to clean because it was constantly used as a shelter by Wallabies and Peafowl. Being open, it was also uncomfortable for the public in windy conditions. The front of the building, facing the Downs, has therefore been glassed in.

Inspections by staff Safety Representatives under the Health and Safety at Work Act took place in March and September.

The programme of tree-planting supported by the Countryside Commission started during the year. The Woodlawn Sanctuary was cleared of old growth to allow for new planting and two new areas, one on the Downs and one near the south-western boundary of the Park, were fenced and made ready for planting, which will be carried out early in 1980.

The Collection

Once again Cheetahs head the list of breeding successes in the Collection at Whipsnade. Four litters of one, four, four and five cubs were born, bringing the total births by the end of 1979 up to 66 from nineteen litters.

Although the breeding of Cheetahs has been primarily with Whipsnade-born animals, five different males and four different females have been involved, including two imported males. Another captive bred male has been brought in to be used for breeding as soon as he is old enough. The only adult female born at Whipsnade which has as yet not bred has been under investigation at the Zoo Hospital in Regent's Park.

During the year, five Whipsnade-born Cheetahs were sent to other zoos.

Among the usual long list of mammals bred, all of which are recorded in Appendix 4, some merit special mention. 1979 was the first year that all three cows in the Musk Ox group had calves together; unfortunately two of the three calves were males. Other births of note were six European Bison, five Przewalski's Horses, two of which died soon after birth, two Onager, one Common Hippo, one Pygmy Hippo, three White Rhinoceros, the last being the twentieth to be born at Whipsnade, and one Black Rhinoceros.

Eighteen more Humboldt's Penguins were hatched during the year, most of them from parents themselves hatched at Whipsnade. The King Penguins continued to thrive and another chick was hatched. Of the total flock of twelve birds at the end of the year, seven were bred at Whipsnade. Rosy and Chilean Flamingos did well again with nine and eleven chicks raised respectively. Another Australian Cassowary was hatched, following the initial success with this species in 1978.

The number of free-running Red-necked Wallaby had been increasing for some years and, although many were sent to other collections, the population was becoming far too large for the space available. Nature has now taken its course. The severe weather early in the year caused heavy losses, and up to the end of April 413 dead Wallabies had been picked up. The population that remains, and presumably consisting of the fittest animals, now numbers about 250.

There were few other casualties directly attributable to the bad weather, but foxes, attracted into the Park, killed some 40 birds.

The disposal of certain animals, particularly males, is becoming more difficult. Surplus males in some herd species, particularly antelopes, cannot usually be left in the herd. They must either be kept separately, involving extra expense, sent away, or culled. The bachelor herd is a natural phenomenon, but has not in the past been a normal way of exhibiting zoo animals. Zoos can, however, help each other by keeping male groups. This not only helps solve the problem of disposal, but provides a reserve against losses. The Society has given a lead in this respect by establishing groups at Whipsnade, including Thomson's Gazelle, Blackbuck, Scimitar-horned Oryx and, during 1979, Common Waterbuck. This is an important development in the scientific management of major zoological collections.

A group of sixteen Squirrel Monkeys was acquired as an exhibit for the enclosure formerly known as the Gibbon Island. With a shallow moat for a barrier, the choice of suitable species for exhibition in the enclosure was difficult. The Squirrel Monkeys seem to be doing well and had started to breed by the end of the year. Three beech and two oak trees provide a fine natural background, and are too big to be damaged by small animals.

The oldest of the Bottle-nosed Dolphins, 'Sheba', died in January; she had been in the Water Mammals Exhibit since its opening in 1972 but had been in poor health for some time and was thought to be relatively old.

It was decided in 1976 to increase the size of the Red Deer herd to see whether the species could be economically farmed. After three breeding seasons it became clear that the project was not economically viable in the conditions at Whipsnade. The herd has now been disposed of.

The Llama herd was also drastically reduced in size during the year, leaving enough stock to provide draught animals for the riding-carts at both Whipsnade and Regent's Park.

Among the many animals sent to other collections were a group of four Whipsnade-born Przewalski's Horses to the private collection of Mr Tim Walker at Bradford-on-Avon. Mr Walker had agreed to co-operate with the Society and Marwell in the management of this important species. A genetic study is being carried out by the Society's staff at Regent's Park and Whipsnade in co-operation with other important collections of the species, including Prague Zoo, the studbook keeper for the Przewalski's Horse.

A young female Common Hippopotamus, born at Whipsnade in 1978, was presented to the Swaziland Government for the Mlilwane Wildlife Sanctuary, the national game park. The Sanctuary has a male Hippo living in a large dam,

but other specimens could not be obtained locally. The transfer was sponsored by the Trust which manages the Mlilwane Sanctuary on behalf of the Swazi Government. South African Airways provided free transport for the animal from London to Johannesburg.

Scientific and Educational Activities

Scientific Meetings

Eight scientific meetings were held during the year, and a number of the papers presented were based on work published in the *Journal of Zoology*. Other contributions included papers by Dr C. Polge on 'Transplantation and preservation of mammalian embryos' and by Dr I. F. Spellerberg on 'Thermal relations of reptiles', both in the third of the meetings on 'The scientific basis of wild animal husbandry' introduced by Dr M. Peaker. Dr L. B. Halstead spoke on 'The biology and conservation of the Straw-coloured Fruit Bat, *Eidolon helvum*, in West Africa', and Professor M. H. Smith on 'Population biology of the White-tailed Deer in the south-eastern United States'. Dr E. N. Arnold gave a paper on 'Spiny-footed lizards (*Acanthodactylus*), or the drawbacks of estimating phylogenies at low taxonomic levels', and Dr P. M. C. Davies on 'The energetics of thermal adaptation in temperate reptiles'. In June the Thomas Henry Huxley Award winner for 1978, Dr D. W. Macdonald, spoke on 'The flexible social organizations of Carnivora'. At the October meeting on 'Microevolution in Vertebrate Populations', Professor E. H. Ashton spoke on 'Microevolution in the St. Kitts Green Monkey (*Cercopithecus aethiops sabaeus*)', together with Dr P. H. Greenwood on 'Microevolution run riot: African cichlid fishes', and Dr G. Underwood on 'The evolution of New Guinea natricine snakes'. The last of the year's meetings included contributions from Dr D. W. T. Crompton on 'Alimentary parasitism: the rat-*Moniliformis* relationship', and from Dr G. Kearn on 'The biology of a monogenean fish skin parasite'.

Symposia

The following symposia were held:

31 May and 1 June: 'Perspectives in Primate Biology' organized by Professor E. H. Ashton and Professor R. L. Holmes in honour of the 75th birthday of Professor Lord Zuckerman.

22 and 23 November: 'Biology of the House Mouse', organized by Professor R. J. Berry.

Publications

Journal of Zoology Volumes 187, 188 and 189 were published and together contain 120 papers. The Council would like to thank the many referees who so generously give their time to help in the assessment of the very large number of manuscripts submitted for publication.

Transactions Two parts were published: Volume 35, Part 1, 'The breeding and early development of *Clarias gariepinus* (Pisces: Clariidae) in Lake Sibaya, South Africa, with a review of breeding in species of the subgenus *Clarias* (Clarias)'; 'The food and feeding behaviour of *Clarias gariepinus* (Pisces: Clariidae) in Lake Sibaya, South Africa, with emphasis on its role as a predator of cichlids'; 'The role of diel inshore movements by *Clarias gariepinus* (Pisces: Clariidae) for the capture of fish prey', by M. N. Bruton; and Volume 35, part 2, 'Mesostigmatic mites of Britain and Ireland (Chelicerata: Acari–Parasitiformes): An introduction to their external morphology and classification' by G. O. Evans and W. M. Till.

Symposia One volume was published: No 44 'Fish phenology: anabolic adaptiveness in teleost fishes', edited by Dr P. J. Miller.

Zoological Record

Volume 110 (1973 literature): Publication was completed early in the year.

Volume 111 (1974 literature): Publication was completed during the year.

Volume 112 (1975 literature): Fifteen Sections have been published and the remainder are in the course of production.

Volume 113 (1976 literature): Eight Sections have been published, twelve are being processed, and the initial computer-processing stage (keying), for the remainder will begin early in 1980.

Volume 114 (1977 literature): Eight Sections are with the printers and indexing is in progress for the next group of nine sections. A revised vocabulary and style of indexing have been introduced and the Sections are being prepared for conventional (not computer-assisted) printing methods. This is to allow sufficient time for the data capture equipment to be replaced and tested before it is used in the production of a volume.

Discussions have been held during the year to investigate the possibility of producing the *Record* in partnership with *Biological Abstracts/BioSciences Information Service* (*BIOSIS*).

Dr H. E. Kennedy (Executive Director, BIOSIS) and Mr J. R. Smith (Director of Research and Development, *BIOSIS*) visited the Society's offices and the *Record* unit in Boston Spa, and Dr Marcia Edwards (Editor, *Zoological Record*) spent some time at *BIOSIS* headquarters in Philadelphia, and attended the meeting of the *BIOSIS* Board of Trustees at which the proposed partnership was discussed. The proposals, which enable the Society to retain editorial control, while *BIOSIS* becomes responsible for management and finance, have been approved by the Council and the *BIOSIS* Board, and it is hoped that an agreement will soon be concluded.

An International workshop, arranged jointly by *Zoological Record* and *BIOSIS*, was held in London in January. The progress so far achieved in the project to develop common practices to handle biological nomenclature, was demonstrated to an audience of biologists and representatives of information services. The same project was the subject of a paper given by Mrs Marilyn Smith to the Fourth International Symposium on the Study of European Invertebrates, held in Saarbrucken, which she attended on behalf of the Society.

B. D. S. Smith, and other members of staff have continued to assist the Curator of Birds with the compilation of the *Birds of the Western Palaearctic*.

The Council is grateful to the Trustees and staff of the British Museum (Natural History) for accommodation and advice; to the Board of the British Library and to the Director General of its Lending Division at Boston Spa, for access to the library and other assistance; and to the staff of the United Kingdom Chemical Society Information Service for their advice and assistance in the operation of the computer-assisted system.

The Council is also indebted to those zoologists who continue to assist with the compilation of the *Record* and to those institutions (listed in Appendix 6) whose contributions

towards the heavy expenses of the *Record* are most gratefully received.

International Zoo Yearbook

Following the precedent set in Volume 17, Volume 20 of the *International Zoo Yearbook* contains the papers given at the third of the World Conferences on Breeding Endangered Species in Captivity. The meeting was held in San Diego in November, 1979 and was organized by the Zoological Society of San Diego and the Fauna Preservation Society. Despite an unusually swift production schedule, the *Yearbook* will appear later in the year than usual.

Like the London conference the papers stress the importance of inter-zoo co-operation. The reptile, bird and mammal species covered include those with well-established, captive breeding groups as well as those whose captive reproduction is still rare, such as the Sea Otter and the Andean Flamingo. There are reports on breeding for re-introduction to the wild and programmes related to particular faunas, such as the Mascarene animals at Jersey and the biblical species in the wildlife reserves of Israel.

The *Yearbook*'s regular section 'New Developments in the Zoo World' contains articles on breeding, hand-rearing and husbandry and records research on populations of captive animals which have been contributed by zoos and research workers around the world. Of particular interest, is the report on the 'International Symposium on the Use and Practice of Wild Animal Studbooks' organized by IUDZG and held in Copenhagen in October 1979. The publication of up-dated rules and guidelines for studbook keepers and users will provide a constant reference for many years to come. Volume 20 also contains the latest 'List of Zoos and Aquaria of the World', the 1978 lists of wild animals bred in captivity, the census of rare animals in captivity and the official list of studbook keepers.

The Library

The library continues to provide a full library service to the Fellows and Associates of the Society and the Society's staff. Work has also proceeded on the editing of the new library catalogue in preparation for its expected publication.

As usual the Library has played its part in the general library service of the country, not only by participating in the national system of interlending, and by answering requests for information from other libraries and organizations, but also by assisting in the training of Librarians. There have been organized visits by library students and the staffs of other libraries, and the Librarian has supervised, or helped with, the practical work of students from various library schools and colleges. There have also been visits from overseas librarians to study the Library and its organization.

Every effort has been made to ensure that the stock of the Library continues to be a comprehensive collection of zoological literature, and the Council is grateful to those who have helped to achieve this aim.

Among the donations to the Library is a collection of books and pamphlets from the Hon Ivor Montagu and a collection of books from the Fauna Preservation Society. Mr A. W. Baker has continued to be a generous donor of books to the Library. Among other donors to the Library were: Mr R. Fiennes, Sir Charles A. Fleming, Dr J. F. D. Frazer, Dr L. B. Halstead, Dr N. Kalabukhov, Professor Dr A. Stolk, Mrs J. G. Wadsworth, Dr P. Whitfield, Dr G. J. Williams, Dr M. Zverev and Dr G. C. N. Zyambo, Director of National Parks and Wildlife, Zambia.

Education Department

Programme for Schools

During the year the charge for attending lecture-demonstrations was twice increased. Coming at a time when the budgets of schools were being cut back, these increases affected attendances during the autumn term. Earlier in the year, attendances compared well with 1978. The number of pupils attending was:

Regent's Park:	Spring Term (Secondary Schools)	20,920
	Summer Term (Primary Schools)	16,600
	Autumn Term (Secondary Schools)	17,550
Whipsnade Park:	Summer Term (Secondary Schools)	3,811
		58,881

For the year as a whole, the total was very close to that for 1978, being about one per cent lower. In December a symposium for sixth-form biology students was held. Its subject was *The Natural History of the River Thames*. Mr Alwyne Wheeler of the British Museum (Natural History) was Chairman, and the speakers were Professor Eric Brown, of Department of Geography, University College, London, Mr A. L. H. Gameson of Water Research Centre, Stevenage Laboratory, Mr Michael Andrews of Metropolitan Pollution Control, Thames Water Authority, Mr Ian Tittley of Department of Botany, the British Museum (Natural History), Mr Stuart Housden of Royal Society for the Protection of Birds, Mr Alan Howard of Fisheries Laboratory, Burnham-on-Crouch, Dr A. D. Berrie of Freshwater Biological Association, River Laboratory, Wareham, and Mr Terry Langford of CERL Marine Biology Laboratory, Fawley, Southampton. The Society's Meeting Room was filled to capacity by an enthusiastic audience.

Other Courses and Events

Once again a short course for University students of Zoology took place during the Easter vacation. The Lecturers were Dr G. W. Potts, Marine Biological Association of the United Kingdom, Plymouth; Mr J. P. W. Rivers, London School of Hygiene and Tropical Medicine; Dr Garth Underwood, City of London Polytechnic; and Dr A. F. Dixson, Wellcome Laboratories, Institute of Zoology, The Zoological Society of London. As is also the case with the speakers at our sixth form symposia, the Council is grateful to those Fellows of the Society and others who give their time to make these courses so successful.

At the end of the Summer term members of the staff of the Society's Education Department once again assisted in conducting a course for sixth form pupils studying biology at schools of the Inner London Education Authority. During the year special lectures were organized for groups from Bromley College of Technology, Chelmer Institute of Higher Educa-

Research

tion, Chelsea School of Chiropody, East Ham College of Technology, Goldsmith's College, The London Foot Hospital, The Middlesex Polytechnic, Paddington College, The Polytechnic of North London, and the Royal National Institute for the Blind.

Christmas Lectures

During the Christmas holidays three meetings were organized for the children and young friends of members of the Society. Mr Stephen Pollock spoke on *A Zoological Expedition to Guyana* and Mr Michael Boorer on *Animal Language*. The film *The Living Arctic* was also shown.

Young Zoologists' Club

During the year the Club subscription was increased from £1·50 to £2·50. Three editions of *Zoo Magazine*, the Club's journal were issued. Activities included visits to Dudley, Howletts, and Chester Zoos. Talks, film shows, and *Zoo Quest* competitions at both Regent's Park and Whipsnade also took place. As an experiment informal meetings on the themes *Birds in the Zoo* and *Picturing Animals* were held at Regent's Park during the school summer holidays.

INSTITUTE OF ZOOLOGY

Department of Veterinary Science

Regent's Park

During the course of the year 349 animals from the Collection were examined clinically, either in their quarters or after admission to the Hospital. A further 186 were referred from veterinary practices, principally in the London area. 834 post-mortem examinations were carried out, including 15 for the Royal Parks and 127 from other external sources.

No serious outbreaks of disease occurred during the year. Parasitic skin mites and bacterial infections, particularly of the respiratory and digestive system, continue to be a problem in the Clore Pavilion, mainly because of the warm, humid atmosphere of the house and the large numbers of animals, especially rodents, in the building. More deaths than usual occurred as a result of fighting among the adult ungulates kept on the Cotton Terraces.

The Giant Pandas and all the cats in the Collection were re-vaccinated against feline enteritis during the year. A number of investigations were carried out in association with the Society's working party on zoo animal nutrition in order to evaluate the digestibility of certain foods and to determine the energy requirements of some species.

Research into the reproductive cycles of primates and felines continues, and investigations of the cardiovascular and respiratory changes in sedated and anaesthetized carnivores and ungulates has been started. The Department collaborates with workers around the country on many other projects associated with the management of our stock or problems of comparative medical interest.

Whipsnade Park

During the year 837 post-mortem examinations were carried out on animals from the Collection. This figure is approximately three times the usual annual figure and was largely due to the heavy losses in the Red-necked Wallaby group during the winter. This mortality was triggered by the severe weather conditions but an important factor was overpopulation. Six Sitatunga died with suspected malignant catarrhal fever, and it is possible that this was contracted from Brindled Gnu calves housed in the same building. An equine influenza virus affected the herd of Przewalski's Horses and resulted in the death from pneumonia of one foal. Large numbers of Corona virus particles were found in the faeces of several species of ruminants where haemorrhagic diarrhoea was a clinical sign.

Nuffield Laboratories of Comparative Medicine

Genetics and Haematology

Dr Rachel A. Fisher joined the Laboratories as Head of the Pathology Department and has greatly extended the genetic studies of the Institute. She has been joined by Dr J. G. Matthews and Dr D. B. Whitehouse, postdoctoral Research Fellows appointed with the assistance of the ABRC grant. A specimen bank of some 2000 blood and tissue samples has already been accumulated. The laboratory is equipped to deal with some 50 genetically determined biochemical markers and work is proceeding on Przewalski's and other horses, the Great Apes, Squirrel Monkeys, Lemurs, Peccaries and cats in the Society's and other Collections. Because of inbreeding in zoo

populations, genetically determined disease occurs and is in urgent need of study so that breeding stock can be selected and suitable matings made.

Dr Christine M. Hawkey continues to carry out routine haematological studies on animals in the Collections and has standardized methods for counting the nucleated red cells of birds and reptiles. A collection of normal values for non-mammalian species is now being made. Studies continue on the changes that occur in blood counts during sedation.

Mr P. D. Butcher has completed his study of the haemoglobins that cause the red cells to become sickle-shaped under certain physiological conditions. Mr P. C. Pearce has joined the department to study the effect of thyroid hormones on developing heart muscle, and Miss Lynne Aplin to study the comparative biochemistry and genetics of red cells.

Infectious Diseases

Dr G. R. Smith has studied mycoplasmas recently isolated from goats and sheep in USA, Europe and Australia that are serologically indistinguishable from *Mycoplasma mycoides* subsp. *mycoides*, the causative agent of contagious bovine pleuropneumonia. This causes concern because these regions were believed to be free of the disease. The techniques developed by Dr Smith show important differences between the strains.

Dr Vija Dent has completed her 5 year project on the microbiology of dental plaque from a variety of animal species; this is the first study of its kind ever made, and has provided valuable basic data. Certain species of *Streptococcus* and *Actinomyces* survive variations of conditions in the mouth and are always present in dental plaque. Others, such as *Streptococcus mutans*, the organism associated with the development of dental caries, only occur in animals with diets rich in carbohydrate.

Dr A. Voller's unit has been designated a Collaborating Laboratory of the World Health Organization and during the year some 200 visiting scientists have been trained in immunoassay techniques. Dr Ann Bartlett, Dr D. E. Bidwell and Dr Voller have conducted training courses and Workshops in East Germany, India and China.

Mr C. D. V. Black has completed a three-year project on the use of liposomes as carriers of chemotherapeutic drugs in the treatment of parasitic diseases.

Biochemistry

Dr M. A. Crawford and his colleagues have continued their studies of the essential fatty acids in nutrition. Mr G. Williams, with the collaboration of the North West and Alaska Fisheries Service, has analysed the lipids in the brains and livers of wild caught and captive dolphins. Although the marine food chain is rich in n-3 fatty acids, the tissues of dolphins contain significant amounts of n-6 series and more closely resemble those of land mammals. These observations will help to monitor the nutrition of dolphins in captivity.

Dr A. Hassam and Mr D. Kuhn, using radiotracer techniques and biological assays, have demonstrated the importance of dietary essential fatty acids in providing a metabolic pool for the synthesis of prostaglandins that affect the aggregation of blood platelets and other important physiological processes.

Mrs Wendy Doyle, in collaboration with Dr B. Laurance (Queen Elizabeth Hospital for Children) is carrying out a survey of maternal nutrition during pregnancy and its influence on birth weight. Laboratory studies have shown that the long-chain unsaturated arachidonic acid (20 : 4, n-6) accumulates in the placenta in amounts greater than in any other tissue.

Professor P. Budowski, on sabbatical leave from the Hebrew University, Jerusalem, has studied the effects of linolenic acid on cerebellar function.

Radiology

Professor G. H. du Boulay, together with Dr D. J. Boullin and Dr B. E. Kendall, have studied the effects of the recently discovered naturally occurring substance prostacyclin on spasm and thrombosis in the cerebral circulation after subarachnoid haemorrhage.

At the request of Dr Rosalie David of the Egyptology Section of the Manchester Museum, Professor du Boulay and Mrs Victoria Aitken were asked to identify the fauna buried with some 28 mummies by examining radiographs made at the Manchester Royal Infirmary. Comparison with X-rays in our own Wellcome Animal X-ray Museum and with skeletons at the British Museum (Natural History) with the help of Mr G. S. Cowles and Dr Pauline Jenkins, made it possible to name three types of hawk as well as the Sacred Ibis, Giant Musk-Shrews, a small dog, several cats and many Crocodiles of different ages. One small bird and one snake remained unidentified.

Wellcome Laboratories of Comparative Physiology

Hormone Assays

A range of radioimmunoassays for steroid and protein hormones were developed by Dr Rosemary C. Bonney and are now in routine use. These include assays for total oestrogens, oestradiol-17 beta, oestrone and oestriol, testosterone, progesterone and pregnanediol-3 alpha-glucuronide. Work is in progress on assays for the gonadotrophins and prolactin. Wherever possible assays are used in analysis of urine samples as well as plasma, enabling the monitoring of reproductive events such as ovulation, pregnancy and puberty in animals that are not easily available for blood sampling.

Reproduction in Zoo Animals

Great Apes

Projects on reproduction in Gorillas, Orang-utans and Chimpanzees were completed by Dr R. D. Martin and Miss Susan Kingsley, establishing baseline data for menstrual cycles and pregnancy in females and the normal androgen levels in males. A service was established to diagnose pregnancy in apes and this was carried out for six zoological collections in the United Kingdom and four in Europe. Studies on the testes of 'Guy' after his death in 1978 and on two other captive Gorillas indicate that they suffered from testicular atrophy and dysfunction. Studies on testosterone levels in breeding and non-breeding Gorillas are continuing. The excretion of steroids in urine was monitored during 12 pregnancies in Orang-utans, giving a mean gestation period of 257 days. Studies were also carried out to correlate hormonal and behavioural events in Orang-utans.

Giant Pandas

The two Giant Pandas in the Society's collection were studied extensively, through behavioural observations and hormone levels in urine by Drs Bonney, A. F. Dixson and J. P. Hearn. Both pandas show rising levels of sex hormones indicating that they are approaching sexual maturity. They are now seven years old, and the female should come into oestrus in the spring of 1980. Urine samples from the two nine year old Pandas at the National Zoological Park, Washington, were analysed and showed a clear rise in androgens and oestrogens coincident with oestrus. Although no evident signs of oestrus have been observed in the female Panda in London, some sexual play and interest were observed in June 1979; research on these animals will be intensified during 1980.

Artificial Insemination

Drs H. D. M. Moore and Bonney, with Mr D. M. Jones of the Veterinary Department, studied the oestrous cycle of the Puma, Cheetah and domestic cat to develop methods of artificial insemination for felid species that are endangered in the wild, and that do not breed well in captivity. Techniques for collection of sperm were developed successfully and attempts to breed by artificial insemination are now in progress. Projects on artificial insemination in Yaks, Sooty Mangabeys and African Elephants were completed by Dr Moore, Mr G. Nevill and Mr Jones.

Laboratory Primate Research

Breeding colonies of four species of New World primates have been successfully established. Studies of the reproductive physiology of these species (Owl Monkeys, Cotton-headed Tamarins, Red-mantled Tamarins and Common Marmosets) are providing a great deal of data on the cycle, pregnancy and puberty. Systems of management are being evolved to create optimum breeding conditions and to provide the most favourable captive environments for these primates so that no importations from the wild are necessary. Studies on the cycle and pregnancy are being carried out by Drs Bonney, Dixson and Hearn and by Mrs Heather Brand and Mrs Cilla Henderson. Significantly, the colony of Cotton-headed Tamarins have commenced breeding well in the last year and Mrs Brand has obtained baseline data on this rare species. Dr Dixson and Mrs Jacqueline Hunter are studying the hormonal control of aggressive and sexual behaviour in Owl Monkeys and the way in which these animals communicate through scent marking and olfactory cues. Puberty begins at between 250–300 days of age in this species. Dr Bonney, in collaboration with Dr K. Setchell of the MRC Clinical Research Centre, carried out a study on the urinary excretion of steroids during the cycle in the Owl Monkey, finding a 16-day cycle with the major metabolites of interest being oestrone and 6-hydroxypregnanolone.

Research work on the Common Marmoset is progressing well. Drs Dixson and Susan Schofield studied the distribution of monoamines in the brain of this species and are constructing a stereotaxic map of the Marmoset brain. Dr Hearn and Mrs Henderson initiated a research project on the endocrinology of fetal and neonatal development in the marmoset, and Dr Moore is starting a project on the control of sperm maturation and epididymal function in this primate. The latter project is an extension of Dr Moore's work on the biochemistry of epididymal function in rabbits and rats, in which he has succeeded in raising antibodies to epididymal proteins that will prevent fertilization. Dr W. Holt continued his work on the biochemistry and morphology of sperm development in various domesticated agricultural species, and is continuing research into the role of sialic acid and glycoproteins during sperm maturation.

Field Work

Dr S. K. Bearder completed his studies of Bushbabies in South Africa. Analysis of the data, collected over a two-year period in the field, provided new evidence on breeding seasonality, growth and reproduction in these animals. Correlation of climatic and reproductive factors showed how the social structure and movement of Bushbabies depended on the availability of food, the temperature and the phase of the moon.

Staff

Dr J. P. Hearn was appointed Director of the Wellcome Laboratories in February 1979, taking up the post full-time in September. In addition to the new staff engaged to work on genetic studies, Mr D. C. Kuhn was appointed to work on prostaglandins, Mr P. C. Pearce, in collaboration with the Royal Free and National Heart Hospitals, on cardiomyopathy, and Miss Lynne Aplin, in collaboration with King's College, London, on the biochemistry and genetics of red cells. Dr Vija Dent left to work at the London Hospital Medical College; Mr N. A. Flint, to the National Institute for Medical Research and Dr A. G. Hassam, to become Scientific Director of Bio Oils, Ltd. Dr A. Voller was appointed Reader in Immunology in the University of London. Dr L. G. Goodwin was invited to deliver the Schofield Memorial Lecture at the Ontario Veterinary College and was elected President of the Royal Society of Tropical Medicine and Hygiene. Dr Susan Schofield took up her MRC postdoctoral fellowship in February 1979 to study monoamines and the control of aggressive and sexual behaviour in marmosets. Dr S. K. Bearder completed his fellowship and was appointed Lecturer in Anthropology at Oxford Polytechnic. Dr W. V. Holt was awarded his PhD degree at the Royal Veterinary College for his work on sperm morphology and biochemistry. Mrs Cilla Henderson was appointed research assistant to Dr Hearn from 1st November 1979.

Visitors who worked at the Institute of Zoology during the year included:

Dr M. Galveo and Dr M. Brough (Westminster and St George's Hospitals), Professor P. Budowski (Hebrew University, Jerusalem), Mr J. Allen (student, Melbourne), Miss J. Lynne (student, Surrey University), Miss Maya Stavy (Tel Aviv University), Miss Vera Peters (University of Jiuz de Fora, Brasil), Drs Samia Mohamed and Mohamed Amer (Giza Zoological Gardens, Cairo), and Mrs Olive Kojman (veterinary graduate from Budapest).

Advisory and Consultant Services

Every day the Society receives requests for information and advice. This ranges from telephone calls from children about their pets, to requests for help with government enquiries or major scientific studies.

The following list of advisory and consultancy services offered by the Society's staff is meant to be illustrative rather than exhaustive.

Animal Management and Conservation

An ecological study of areas in northern Niger which might be suitable for desert and sub-desert parks and reserves.
Nature Conservancy Council: Preparation of data sheets on wild mammal species in the British Isles.

Architecture and Planning

Municipality of Tripoli, Libya: Continuing advice to consultants on the design, equipping, staffing and management of the proposed new Tripoli Zoo.
Oran, Algeria: Preliminary advice to consultants of a feasibility study for a new zoo.
Damascus, Syria: Preliminary advice on Mount Kassioun Zoo.
Jurong Bird Park, Singapore: Research and advice on replacing mesh over five-acre walk-through Aviary.

Comparative Medicine

Action Research on Multiple Sclerosis: Advice and collaborative studies on dietary management in multiple sclerosis.
Agricultural Research Council – Institute for Animal Diseases: Collaborative studies on the serodiagnosis of *Babesia* infections in cattle.
British Council: Advice on dietary fats in pregnancy and lactation in India; advice on enzyme immunoassays.
British Museum (Natural History): Radiological examination of fish skeletons.
CIBA-Geigy, Switzerland: Collaboration on development of adjuvants.
European Economic Community: Advice on serological methods.
Galton Laboratory: Studies on human and comparative genetics.
Laboratory of the Government Chemist: Collaborative analytical studies of lipids.
Manchester Museum: Radiological examination and identification of mummified animals.
Middlesex Hospital Medical School: Haematological examination of animals. X-rays of primate skulls.
Ministry of Agriculture, Fisheries and Food: Collaboration on the analysis of dietary lipids.
National Heart Hospital: Collaborative studies on cardiomyopathy.
National Museum of Wales: X-rays for the identification of fishes.
North Karelia Coronary Prevention Project, Finland: Analysis of milk lipids, adipose tissue and dietary fats.
Ortho Diagnostics, USA: Collaboration on development of immunoassays.
Roche Products Limited: Collaborative studies on essential fatty acids and prostaglandins.
Royal Free Hospital Medical School: Collaborative studies on cardiomyopathy; production of antisera.
Unilever, Vlaadingen, Holland: Collaboration on lipid analysis.
US Department of Commerce: Studies on dolphin lipids.
World Health Organization: The Nuffield Laboratories of Comparative Medicine are recognized as collaborating centres for malaria reference and research, comparative medicine and pathology of undomesticated vertebrates, and the fatty acid composition of human milk. Visits to advise on serology to East Germany, India, People's Republic of China, Switzerland; advice on breast milk analysis.
Zoos: Radioimmune-assays for monitoring hormonal status and pregnancy; genetic phenotyping; haematological and radiological examinations.

Comparative Physiology

German Primate Research Centres (Göttingen and Munich): Advisory visit and lectures on management and reproduction of South American primates.
Institute of Urology (London): Collaborative research on epididymal physiology.
Medical Research Council: MRC Mammalian Development Unit: collaborative research on early development in primates; MRC Reproductive Biology Unit: Collaborative research in reproductive endocrinology.
Middlesex Hospital Medical School: Collaborative research on immunology of reproduction.
Royal Veterinary College: Collaborative research on the reproductive physiology of the domestic cat.
University College, Aberystwyth: Training of students in radioimmunoassay techniques.
University of London: Collaborative research and teaching with Bedford College (primate evolution and reproduction) and University College (reproduction in mammals). Training of students in radioimmunoassay techniques and in behavioural studies.
World Health Organization: Visits to give lectures and technical advice on primate reproductive physiology in Bangkok (Chulalongcorn and Mahidol Universities, Hong Kong (Chinese and Hong Kong Universities), Nairobi (University of Nairobi and the Institute of Primate Research). Training of staff from the Institute of Research in Reproduction, Bombay and the University of Juiz de Fora, Brazil.
Yerkes Primate Research Center, (USA): Visit for collaborative research on the physiology and behaviour of reproduction in great apes.
Zoos: Radioimmunoassays for pregnancy diagnosis and hormonal status in great apes; and for sexing monomorphic birds. Advice on husbandry of Marmosets.

Training and International Liaison

British Council: Liaison visit by Director of Prague Zoo.
Nigerian Government: Training three keepers from Kano, Jos and Nekede Zoos.
Pakistan Government: Training zoo technician from Lahore Zoo.
City of London Corporation: Training staff from London Airport Quarantine Station.

Veterinary Consultancy Services

Mefit Babtie (on behalf of Commissioner for the Jonglei Area of Southern Sudan), Chairmanship of the Scientific Steering Committee advising on ecological work in the Jonglei Area.
Brooke Hospital for Animals, Cairo: Advice on veterinary aspects.

Consultant Veterinary Advice: Bedford College, London. London School of Hygiene and Tropical Medicine (Microbiology Department); University College, London (Anatomy Department); Veterinary practices on a world-wide basis, and zoological collections in Britain, in particular Marwell, Twycross, Jersey and Chester Zoos.

Collaboration with Scientific Societies, Zoological, Conservation and Research Organizations

The Society's staff, whether in an individual capacity or as representatives of the Council, play an active role in many organizations concerned with the publication of specialist journals, animal management, conservation and other specialist research activities.

Animal Haematology Group: Dr C. M. Hawkey (Vice Chairman); Mr M. G. Hart (Committee)

Animal Health Trust: Dr L. G. Goodwin (Scientific Advisory Committee)

Biological Council: Mr P. J. Olney (Council)

British Institute of Radiology: Professor G. H. du Boulay (Past President; Council and Appeal Co-ordinator)

British Ornithologists' Union: Mr P. J. Olney (Hon. Sec); Mr B. D. S. Smith (Assistant Editor, Ibis)

British Veterinary Association: Mr V. J. A. Manton (Small Animals Committee and Steering Committee on Keepers Training Correspondence Course); Mr D. M. Jones (Welfare Committee).

British Veterinary Zoological Society: Mr V. J. A. Manton (President); Mr D. M. Jones (Secretary); Mr D. G. Ashton (Assistant Secretary); Mr J. A. Dale (Hon. PRO)

Council for Nature: Mr M. K. Boorer (Youth Committee)

Department of the Environment: Mr P. J. Olney (Royal Parks Bird Sanctuaries Committee); Dr J. P. Hearn (Scientific Authority for Animals)

Department of Health and Social Security: Professor G. H. du Boulay (Advisory Committees on Computerized Tomography)

European Association for Aquatic Mammals: Mr V. J. A. Manton (Secretary/Treasurer until March, 1979)

European Association of Radiology: Professor G. H. du Boulay (British delegate to the Students Commission and Member of Computer Applications Committee).

Fauna Preservation Society: Mr D. M. Jones (Council)

International Council for Bird Preservation (British Section): Mr P. J. Olney (Council)

International Council of Scientific Unions – Abstracting Board: Mr M. N. Dadd (Executive Committee, Chairman of Publications and Annual Meeting Sub-Committees)

International Ornithological Committee (Committee of 100): Mr P. J. Olney (Committee)

International Union for the Conservation of Nature and Natural Resources (Survival Service Commission): Mr P. J. Olney (Member of Commission, Member of Captive Animal Breeding Group); Mr C. G. C. Rawlins (Vice-Chairman, Captive Animal Breeding Group)

International Union of Directors of Zoological Gardens: Mr C. G. C. Rawlins (President)

Journal of Clinical Pathology: Dr A. Voller (Editorial Board)

Journal of Comparative Pathology: Dr G. R. Smith (Editorial Board)

Journal of Immunological Methods: Dr A. Voller (Editorial Board)

Journal of Immunoassay: Dr A. Voller (Editorial Board)

Journal of Medical Microbiology: Dr G. R. Smith (Editorial Board)

Journal of Medical Primatology: Dr J. P. Hearn (Editorial Council)

Journal of Reproduction and Fertility: Dr J. P. Hearn (Executive Council)

Linnean Society of London: Dr Marcia A. Edwards (Council and Editorial Committee)

Mammal Society: Mr M. N. Dadd (Joint Editor, *Mammal Review*)

Mason Medical Research Foundation: Dr L. G. Goodwin (Research Advisory Committee)

Medical Research Council: Dr L. G. Goodwin (Chairman, Simian Virus Committee)

National Film Archive: Dr H. G. Vevers (Science Selection Committee)

National Voluntary Panel on Captive Hawks: Mr P. J. Olney (Panel member)

Nature Conservancy Council: Mr C. G. C. Rawlins (U.K. Committee for International Nature Conservation; Working Group on Introductions)

Neuroradiology: Professor G. H. du Boulay (Managing Editor)

Nutrition Society: Dr M. A. Crawford (Council and Programmes Committee)

Overseas Development Administration: Dr L. G. Goodwin (Chairman, Trypanosomiasis Seminar)

Parasitology: Dr L. G. Goodwin (Chairman of Advisory Editorial Board)

Parliamentary and Scientific Committee: Dr M. A. Crawford

Primate Society of Great Britain: Dr A. F. Dixson (Honorary Secretary); Dr J. P. Hearn (Council)

Ray Society: Dr H. G. Vevers (Vice-President)

Royal College of Physicians: Dr L. G. Goodwin (Library Committee)

Royal Society: Dr L. G. Goodwin (Expeditions and Soiree Committees); Mr M. N. Dadd (International Council of Scientific Unions – Abstracting Board, sub-committee of the Scientific Information Committee)

Royal Society of Medicine: Dr L. G. Goodwin, Dr G. R. Smith (Council Members, Section of Comparative Medicine)

Royal Society for the Protection of Birds: Mr P. J. Olney (Committee Member, Research Advisory Committee)

Royal Society for the Prevention of Cruelty to Animals: Mr V. J. A. Manton (Wild Animals Advisory Committee)

Royal Society of Tropical Medicine and Hygiene: Dr L. G. Goodwin (President); Dr A. Voller (Council)

Society for the Study of Fertility: Dr J. P. Hearn (Programme Secretary)

Technical Education Council: Mr P. R. E. Wallace (Sub-Committee on teaching syllabus in Laboratory Management)

University of London: Dr H. G. Vevers (Honorary Research Fellow, Bedford College); Dr J. P. Hearn (Visiting Professor, Zoology Department, University College; Member, Board of Studies in Zoology); Mr D. M. Jones (Member, Board of Studies in Zoology); Professor G. H. du Boulay (Professor of Neuroradiology and Head of the Lysholm Radiological Department); Dr C. M. Hawkey (Hon.

Lecturer in Haematology, Royal Free Hospital); Dr A. Voller (Reader in Immunology and Board of Studies in Preventive Medicine); Mr R. A. Fish, (Subject sub-committee for Biological Sciences Library)

University of Nottingham, School of Agriculture: Dr M. A. Crawford (Honorary Lecturer)

Wellcome Trust: Dr L. G. Goodwin (Tropical Medicine Panel)

World Health Organization: Dr L. G. Goodwin (Chairman of Steering Committee on Filariasis, WHO Special Programme; Scientific and Technical Advisory Committee, Onchocerciasis Research Programme); Dr J. P. Hearn (Steering Committee, Task Force on Infertility Agents from Plants; Adviser, Reproductive Physiology of Primates) Dr A. Voller (Rapid Virus Diagnosis Group and Parasitic Disease Serology Group)

World List of Scientific Periodicals: Mr R. A. Fish (Council)

General Matters

Catering Department and Zoo Restaurants Limited

1979 was not a good year for the Catering Department at either Regent's Park or Whipsnade, due largely to the fall in attendances. There was a small increase in the number of evening functions catered for by the Zoo Restaurants Limited, though the actual numbers of people attending dropped. Functions at Whipsnade Park more than doubled and prospects for developing this part of the work of the Catering Department look promising. The Late Evening Openings for Members were well attended at both Regent's Park and Whipsnade.

Zoo Enterprises Limited

Despite problems created by the lorry drivers' strike, the Customs and Excise work to rule, and the imposition of additional value added tax, results were satisfactory.

Staff

At the end of the year there were 505 full-time members of staff as follows:

	London	*Whipsnade*
Animal Management	94	45
Construction, Maintenance, Gardening, General and Public Services	101	40
Catering and Retail Departments	60	13
Institute of Zoology	66	3
Education and other Scientific Departments, including publication and Zoological Record (of whom 29 work at the Zoological Record Offices, Boston Spa, Yorkshire	54	
Administrative Departments	22	7

A list of the Senior Members of Staff is given in Appendix 2.

General

At the end of October Miss E. M. Owen retired after nearly 23 years service with the Society. During the last twelve years, she was Director of Administration. The debt the Society owes her is considerable. Her devotion to the interests of the Society never flagged and was critical over years of expansion during which conditions became increasingly difficult. She guided the administration of the Society's affairs with great knowledge and sensitivity to detail, and was always a conscientious steward of its resources during a period marked by rising costs, inflation and falling attendances. The Council cannot thank her enough for her service to the Society.

Mr J. A. Dale, Public Relations Officer since the post was created in 1964, left the Society's service at the end of the year to take up an appointment with the RSPCA. He guided and maintained the Society's relations with the public, the press and other media with considerable skill over a period in which many new exhibits were opened, and when national economic and social conditions were changing very fast.

A job evaluation scheme was initiated for all manual, catering and retail staff, with the assistance of an ACAS specialist adviser. A new pay structure for keeper staff was introduced, and the first steps taken towards achieving a common wage settlement date for all manual, catering and retail staff.

Leave entitlements for executive, clerical and technical staff were improved.

Two training places in the animal management departments at London Zoo were created under the Work Experience Programme, sponsored by the Manpower Services Commission. A number of overseas Zoo personnel spent varying periods with the Society on training secondment.

Exchanges of Whipsnade Keeper Staff with the Washington and Sydney Zoos were arranged.

Fourteen of the Society's keepers were successful in the final examination for the Ordinary Certificate in Zoo animal Management, distinctions being obtained by Miss M. Balding, Miss T. Barron, Mr L. Kent, Miss J. Scholefield and Miss S. Tickner. Miss Mary Balding was awarded a Nobby Ashby Prize. Seven keepers obtained a Higher Certificate in Zoo Animal Management. A further series of Zoo Animal Management Courses started in September, with a number of keepers from other zoos joining for the first time. The content of the Courses, run in conjunction with the Paddington College, was reviewed during the year, and it was decided to simplify the syllabus and reduce the length of the Preliminary Course from two years to one.

The Society, through its membership of the Zoo Federation, has been involved in the planning and preparation of a Correspondence Course for Zoo Keepers, which is to be administered by the National Extension College at Cambridge.

The Constitution of the Joint Consultative Committee was revised, to provide for members nominated by the recognized unions, in addition to those elected to represent the various staff groups within the Society.

Awards

The Society's Bronze Medal was presented to Head Keeper S. Morton (Bears, Regent's Park) for long and meritorious service.

The completion of 25 years' service was marked by the presentation of gold watches to B. Chapman (Senior Keeper, Regent's Park), J. Datlen (Overseer, Whipsnade Park), V. Ghiotti (Sous-Chef, Regent's Park), F. Hargreaves (Supervisor, Member's Bar), and R. Willis (Boiler House Assistant, Regent's Park).

Appointments and Promotions

M. R. Hanson, *Director of Administration*
Dr J. P. Hearn, *Director, Wellcome Laboratories of Comparative Physiology*
Dr R. A. Fisher, *Head of Pathology Department, Nuffield Laboratories of Comparative Medicine*
R. B. Willis, *Overseer of Mammals, Regent's Park*
R. R. Smith, *Head Keeper, Clore Pavilion for Small Mammals, Regent's Park*
J. Knight, *Veterinary Officer, Regent's Park*

Resignations and Retirements

In addition to Miss E. M. Owen, CBE, and Mr J. A. Dale,

other retirements included Overseer T. Sangster, after more than 43 years service in London Zoo; Mr R. Gardiner (Chief Boiler House Assistant, Regent's Park) after 24 years; Mr R. Reynolds (Garden Department, Whipsnade Park) after nearly 33 years; Mr G. Hedges after 30 years and Mr J. O'Connor (both of Gardening Department, Regent's Park) and Mr F. Barrett (Stores Assistant, Regent's Park).

Obituary

We regret to record the deaths of Mr G. Mallon, Chargehand, Catering Department, Regent's Park; Mr N. Mulley, Toilet Attendant, Whipsnade Park; and four pensioners: Mr F. Akhurst; Mr J. Myers; Mr G. Robinson and Mr C. Simpson.

Acknowledgements

The Council wishes to thank all Fellows and others who freely give of their time to serve on advisory Committees; their advice and support is of great importance in furthering the work of the Society.

The Council also gratefully acknowledges the help given by many scientists, veterinarians, organizations and firms. The Council wishes to accord its thanks to the British Museum (Natural History) and its staff, and in particular to, Miss A. Grandison, Dr N. Arnold, Mr Andrew S. Stimson, Mr J. E. Hill, who have advised on animal identification, Mr R. B. Stephenson, MAFF, Guildford, for his help in the reception of quarantinable animals at London Airport.

The Council is also grateful to the staff of the RSPCA, London Airport, for the care of animals in transit; Kew Gardens for their ready help; the staff of the Middlesex Hospital for help with emergency snake-bite treatment; Mrs M. Ryan and her colleagues of Paddington College for their co-operation in organizing the keepers' training courses; the Commanding Officer, Training Battalion, RAOC, for providing facilities for the staff to practise the use of emergency weapons; and to the St John's Ambulance Brigade.

The Council also wishes to record its thanks for the help given to:

The Department of Veterinary Science by Dr W. H. Allan, Dr P. H. Anderson, Dr E. C. Appleby, Dr D. Baxby, Mr J. Best, Dr R. Bird, Dr J. P. Blackburn, B.P. Nutrition (UK) Ltd., Cambridge Veterinary Investigation Centre, Dr R. Clampitt, Dr M. Coates, Mr C. M. Colles, Mr P. Collins, Mr N. Comben, Mr D. Coomber, Mr J. E. Cooper, Crown Chemical Ltd., Dr G. A. Cullen, Dr N. F. Cunningham Professor M de Burgh Daly, Dr J. Delhanty, Duphar Veterinary Ltd., Mr K. E. Elgar, Mr J. Eva, Dr R. Finlayson, Dr D. G. Fleck, Dr T. H. Flewett, Dr D. Frape, Dr D. A. Gardner, Dr E. P. J. Gibbs, Glaxovet Ltd., Dr E. J. G. Glencross, Dr L. R. Hill, Hoechst UK Ltd., Dr H. Hoogstraal, ICI Ltd., Mr H. V. Ilsley, Dr I. F. Keymer, Dr L. F. Khalil, Mr P. A. Kingsbury, Dr B. R. Laurence, Dr W. M. F. Leat, Dr P. Lees, Miss G. Lewis, Mr G. H. Lowe, Miss M. H. Lucas, Professor W. H. R. Lumsden, Dr D. W. Mackenzie, Dr D. McBeath, Dr N. S. Mair, Mr J. G. Matthews, May and Baker Ltd., Merck, Sharp & Dohme Ltd., Miss B. Noddle, Mr T. Northwood, Mr P. Ott, Parke David & Co., Dr M. Peaker, Dr P. Philpott, Mr D. Prentice, Reckitt & Colman Ltd., Richard Wolf Ltd., Dr J. Riley, Dr J. Robinson, Roche Products Ltd., Dr B. Rowe, Mr P. G. Sargeaunt, Mr A. M. Scott, Mr G. G. A. Smith, Mr K. G. V. Smith, Smith Kline & French Laboratories Ltd., Spillers Ltd., Sutton Bonnington Veterinary Investigation Centre, Dr L. R. Thomsett, Dr K. N. Tsiquaye, Dr L. H. Turner, Dr P. F. Wadsworth, Dr A. Walker, Dr P. D. Walker, Wellcome Foundation Ltd., Dr G. B. White, Mr W. L. Whitehouse, Miss K. Whitwell, Dr A. T. Willis, Dr S. Willmott and Professor A. Zuckerman.

The Institute of Zoology for project grants provided by the Ford Foundation; The Gatsby Charitable Foundation; the Medical Research Council; the Ministry of Agriculture, Fisheries and Food; The Overseas Development Administration; the Science Research Council; the Wellcome Trust; the World Health Organization; Action for Research into Multiple Sclerosis (ARMS); Bio-Oil Research Ltd; Cadbury Schweppes Ltd; the Council for Scientific and Industrial Research (South Africa); the Drapers' Company; the International Olive Oil Council (Madrid); Ortho Diagnostics Inc; Pedigree Petfoods Ltd; the Pilgrim Trust; Roche Products Ltd; Royal Free Hospital Cardiac Research Fund; Unilever NV (Vlaadingen); and the Wildlife Preservation Trust International. Donations and other financial support have also been provided by the Boise Fund; the Central Research Fund (University of London); the Caribbean Welfare Foundation (through Mrs Dorothy Rand); Ciba-Geigy; the Fauna Preservation Society; Mr Reuben Rausing (Tetrapak Ltd); The Mason Medical Research Foundation; and the Royal Society. We also acknowledge generous donations from Mrs Vincent Astor and an anonymous donor. Many colleagues and friends have provided research material and assistance.

Supplies and Transport Department by the Department of Trade and Industry, Ministry of Agriculture, Fisheries and Food, H.M. Customs and Excise, Medical Research Council, the many people who have kindly offered and sent Bamboo for the two Giant Pandas, also Evergreen Oak for other animals, British Airways, British Rail, R. L. Dobbs Transport, KLM Royal Dutch Airlines, Lufthansa German Airways, Pan American World Airways, Singapore Airlines and Pakistan International Airlines.

Whipsnade Park by the British Red Cross Society, who help to staff the first aid post; Dr C. P. Royall; Mr V. Sherriff; Mr M. Marriott, MAFF; Sailors from H.M.S. Daedalus; Miss J. Buffey and the Countryside Commission; District Cubs and Scouts; Mr T. Mann, British Waterways Board; Gibbs and Dandy Ltd; Lockhart Bennett.

The Council would also like to thank representatives of the Press and the media and photographers for their co-operation during the year, and for their interest in the Society's work.

Difficult times lie ahead for the Society, particularly if the rate of inflation is not abated. But the Council believes that the Society can face the future with confidence, given that it has a loyal and energetic staff. To them must go the Council's greatest recognition and thanks for their co-operation and contribution to the work of the Society.

R. G. Mulley

Secretary

APPENDIX 1

Committees 1979-1980

Gardens and Park Committee

Terms of Reference: To consider matters relating to the layout, appearance, animal housing and amenities other than catering, of the Gardens, Regent's Park and Whipsnade Park; to consult where necessary with other committees and to report to Council so that the advice of the Committee can be taken into account in future planning.

Lester Borley
Lady Casson, RIBA, FSIA
Lord Donaldson, OBE
Sir Dudley Forwood, Bt
A. M. J. Galsworthy
Professor Richard J. Harrison, MA, MD, DSc, FRS
W. Lane-Petter, MA, MB, BChir, FIBiol
Geoffrey Schomberg, FLS
Lady Daphne Straight
Lady Anne Tree
The Duke of Wellington, MVO, OBE, MC *Chairman*
Sir Gordon Wolstenholme, OBE, FRCP, FIBiol
C. A. Wright, DSc, PhD, FIBiol
Secretary: C. G. C. Rawlins, OBE, DFC

Finance Committee

Terms of Reference: To approve the annual estimates and accounts before presentation to Council; to examine the financial aspects of major projects; to receive reports on investments; and to advise Council on financial policy.

E. Michael Behrens
Lord Buxton, MC, DL, *Chairman*
Lord Donaldson, OBE
Sir Terence Morrison-Scott, DSC, DSc
Sir Michael Perrin, CBE, FRIC
C. E. Gordon Smith, CB, MD, FRCP, FRCPath
The Hon Sir Ronald Waterhouse, JP, MA, LLB
Sir Richard Way, KCB, CBE
The Duke of Wellington, MVO, OBE, MC
Secretary: A. M. Jones, FCIS, FAAI, MBIM, TFA

The Institute of Zoology Committee

Terms of Reference: To advise Council on all matters relating to the Institute of Zoology.

S. K. Eltringham, PhD
Professor B. K. Follett, PhD, DSc
I. M. Glynn, PhD, MD, FRS
Sir William Henderson, DSc, FRCVS, FIBiol, FRS, FRSE, *Chairman*
J. S. Perry, PhD, DSc
Sir Eric Smith, CBE, ScD, FRS
D. W. Snow, DSc, DPhil
P. Whittlestone, PhD, MA, MRCVS
C. A. Wright, DSc, PhD, FIBiol
Professor A. J. Zuckerman, MD, DSc
Secretary: L. G. Goodwin, CMG, FRCP, FRS

Animal Welfare and Husbandry Committee

Terms of Reference: To advise Council on matters relating to animal welfare, husbandry and breeding records in the Collections at both Regent's Park and Whipsnade Park, particularly in relation to the work of the Society's Curators, Veterinary Officers and Pathologist.

Professor G. H. Arthur, DVSc, FRCVS
Erasmus D. Barlow, MA, MB, BChir, MRC Psych
Miss Mary Brancker, OBE, MRCVS
Miss Marie Coates, PhD
Malcolm J. Coe, BSc, PhD
David L. Donne
A. R. Jennings, DVSc, MA, MRCVS
J. M. Knowles
Miss Gwyneth Lewis, BSc
A. J. Stevens, MA, BVSc, MRCVS, DipBact, *Chairman*
A. D. Walker, PhD
W. L. Whitehouse, RD, MB, FRCS, FRCOG
Secretary: D. M. Jones, BSc, BVetMed, MRCVS

Education Committee

Terms of Reference: To advise Council on all matters relating to the Society's educational activities.

Professor W. S. Bullough, DSc, *Chairman*
R. J. Court, BSc
J. S. Everton, MA
P. H. Greenwood, DSc, PLS
O. R. Impey, MA, DPhil
T. G. Onions, BSc, PhD, FIBiol
C. H. Selby, HMI
Professor K. Simkiss, PhD, DSc, FIBiol
J. E. Spice, MA, DPhil
D. J. Stanbury, BSc, ARCS
C. J. M. Trewhella, BSc
Peter Ward, BSc, MIBiol
Secretary: M. K. Boorer, BSc, DipEd

Publications Committee

Terms of Reference: To advise Council on matters concerning the publication of zoological research; to serve as an editorial board for the *Journal of Zoology* and *Transactions* of the Society; to make recommendations on Library policy.

Professor E. H. Ashton, PhD, DSc, *Chairman*
Professor A. J. E. Cave, MD, DSc, FRCS, FLS
Professor J. L. Cloudsley-Thompson, MA, PhD, DSc
Miss Vera Fretter, DSc
Professor J. Green, DSc, PhD
J. P. Harding, PhD, FLS
Professor J. D. Pye, BSc, PhD
H. N. Southern, MA, DSc
V. R. Southgate, PhD
Professor J. E. Webb, DSc, PhD
Professor G. P. Wells, ScD, FRS
Secretary: H. Gwynne Vevers, MBE, DPhil, FLS, FIBiol

Zoological Record Committee

Terms of Reference: To advise on the scope and production of the *Zoological Record* and on methods of ensuring its widest distribution.

Professor E. J. W. Barrington, MA, DSc, FRS, *Chairman*
J. Clevedon Brown, PhD, FLS
Robert Cross, MA
P. Freeman, DSc, ARCS, FIBiol
Professor J. Green, DSc, PhD
J. P. Harding, PhD, FLS
C. M. Hutt, FLS
A. K. Kent, PhD
R. A. Neal, DSc, PhD
Donn E. Rosen, PhD
J. G. Sheals, PhD, FIBiol
Errol White, CBE, DSc, FRS
Secretary: Marcia A. Edwards, PhD, FLS

International Zoo Yearbook: Editorial Board

Terms of Reference: To advise on the content and production of the *Yearbook*.

M. R. Brambell, VetMB, PhD, MRCVS, FLS
Lord Craigton, PC, CBE
The Countess of Cranbrook
S. F. Everiss, MBE, MA, MSc, FIBiol
Professor P. A. Jewell, MA, PhD, *Chairman*
Professor Dr Heinz-Georg Klös
J. M. Knowles
Christopher Marler
M. Peaker, PhD
Secretary: P. J. S. Olney, BSc, DipEd, MIBiol, FLS

Awards Committee

Terms of Reference: The Council presents awards for contributions to zoology: The Stamford Raffles Award, the Scientific Medal, The Thomas Henry Huxley Award, The Silver Medal, The Zoological Society of London Frink Medal for British Zoologists and the Prince Philip Prize. The Committee advises Council on all matters relating to these awards.

Professor E. J. W. Barrington, MA, DSc, FRS, *Chairman*
Professor J. M. Dodd, DSc, FIBiol, FRS, FRSE
Miss Vera Fretter, DSc
Miss Barbara M. Gilchrist, PhD
H. N. Southern, MA, DSc
Professor J. E. Webb, MA, DSc, PhD
C. A. Wright, DSc, PhD, FIBiol
Secretary: H. Gwynne Vevers, MBE, DPhil, FLS, FIBiol

Promotion Committee

Terms of Reference: To advise Council on measures relating to the promotion of the Society's aims and activities in order to ensure the long-term stability of the Society.

E. Michael Behrens
Lord Buxton, MC, DL, *Chairman*
Lord Donaldson, OBE
The Hon Ivor Montagu
Sir Michael Perrin, CBE, FRIC
Sir Richard Way, KCB, CBE
Secretary: M. R. Hanson

APPENDIX 2

Staff

Directors:
Administration: Miss E. M. Owen, CBE
M. R. Hanson (from October 1979)
Science: L. G. Goodwin, CMG, FRCP, FRS*
Zoos: C. G. C. Rawlins, OBE, DFC
Architect: J. W. Toovey, AADipl(Hons), FRIBA
Deputy Architect: J. C. Wears, DipArch (Dunelm)
Assistant Director of Science, Curator of Aquarium, Acting Curator of Reptiles: H. Gwynne Vevers, MBE, DPhil, FLS, FIBiol*
Catering Manager (London and Whipsnade): C. P. C. Garland
Curator of Birds: P. J. S. Olney, BSc, DipEd, FLS*
Curator of Mammals: vacant
Honorary Research Associate: Professor A. J. E. Cave, MD, DSc, FRCS, FLS*
Curator, Whipsnade Park: V. J. A. Manton, MRCVS*
Education Department:
Education Officer: M. K. Boorer, BSc, DipEd
Assistant Education Officers: W. J. Griffiths, BSc, FETC, S. T. Pollock, MSc, Gillian E. Standring, MA, CertEd
Establishment Officer: M. E. McInerney
Finance Officer: A. M. Jones, FCIS, FAAI, MBIM, TFA
Librarian: R. A. Fish, FLA
Public Relations Officer: J. A. Dale, MIPR
Retail Manager (London and Whipsnade): J. F. Brown

INSTITUTE OF ZOOLOGY:

Director: L. G. Goodwin, CMG, FRCP, FRS

Department of Veterinary Science:
Senior Veterinary Officer: D. M. Jones, BSc, BVetMed, MRCVS
Veterinary Officer (London): J. A. Knight, BVetMed, MRCVS
Veterinary Officer (Whipsnade): D. G. Ashton, MA, VetMB, MRCVS
Senior Technician: A. K. Fitzgerald, RANA

Nuffield Laboratories of Comparative Medicine:

Heads of Departments:
Biochemistry: M. A. Crawford, PhD
Infectious Diseases: G. R. Smith, PhD, MRCVS, DVSM, DipBact
Pathology: Rachel A. Fisher, MB, BS, PhD; *Haematology Section:* Christine M. Hawkey, PhD
Radiology: G. H. de Boulay, MB, BS, FRCP, DMRD, FRCR
Research Assistants: Ann Bartlett, PhD, D. E. Bidwell, PhD, Wendy Putt
Laboratory Superintendent: P. R. E. Wallace, FIST
Administrative Assistant: Patricia E. Wright
Research Fellows: C. D. V. Black, SRN, BSc, Vija Dent, PhD, Wendy Doyle, Dip. Dietetics, D. C. Kuhn, AB, MS (USA), J. G. Matthews, B.Vet.Med., MRCVS, PhD, D. B. Whitehouse, PhD
Honorary Research Associate: A. Voller, PhD, DSc
Visiting Research Graduate: P. Budowski, PhD (Jerusalem)
Postgraduate Research Students: Lynne Aplin, SRN, BSc, Theresa L. Frankel, B.Vet.Sci. (Sydney), Dip.Nutr (Cambridge), P. C. Pearce, MIBiol, MPhil, Isabella A. Quakyi, MIBiol. BSc, D. de Savigny, BSc, MSc (Guelph).

Wellcome Laboratories of Comparative Physiology:

Director: J. P. Hearn, MSc, PhD
Research Fellows: S. K. Bearder, PhD, Rosemary C. Bonney, PhD, A. F. Dixson, PhD, H. D. M. Moore, PhD, Susan P. M. Schofield, PhD
Research Assistants: D. Fleming, MIBiol, Cilla Henderson, BSc
Research Students: Heather M. Brand, MA, Jacqueline Hunter, BSc, Susan Kingsley, BSc
Chief Technician: G. F. Nevill, HNC
Histologist: W. V. Holt, HC, MIBiol, PhD

PUBLICATIONS:
International Zoo Yearbook:
Editor: P. J. S. Olney, BSc. DipEd, FLS*
Assistant Editors: Ruth Biegler, Pat Ellis
Journal of Zoology. Symposia, Transactions of the Zoological Society of London. Nomenclator Zoologicus:
Editor: H. Gwynne Vevers, MBE, DPhil, FIBiol*
Assistant Editor: Marcia A. Edwards, PhD, FLS
Editorial Assistant: L. G. Ellis
Administrative Assistant: Unity M. M. McDonnell, MA
Zoological Record:
Editor: Marcia A. Edwards, PhD, FLS
Managing Recorder: Michael N. Dadd, BSc, FLS, MIInfSci
Systems Analyst: Stuart J. Rammell, BSc, AIInfSci
Senior Recorder: Judith M. Howcroft, BSc

London Zoo

Gardens Executive: J. McCorry
Head Gardener: T. Law
Maintenance Manager: L. G. Taverner
Overseer of Birds: D. H. Newson
Overseers of Mammals: T. Sangster, (till November), J. Lambden, R. B. Willis (from October)
Overseer of Reptiles: D. Ball, AIAT
Purchasing and Transport Manager: H. J. Mason, MInstPS, MASMC
HEAD KEEPERS:
Aquarium: R. Dumbelton
Aquatic Birds and Birds of Prey: D. N. Wood
Bears: S. Morton
Bird House: W. G. R. Daines
Children's Zoo: P. Anscombe
Elephant Pavilion and Aquatics: W. G. Crompton
Insects: R. P. Humphrys, AIAT
Lion House: E. F. Swain
Monkeys: G. Callard
Parrot House and Eastern Aviary: R. J. Watkins
Pheasantry and Ostrich House: R. Barrow
Reptiles: S. B. Savage
Small Mammals: R. B. Willis (till September), R. R. Smith (from October)
Ungulates: T. B. Kichenside

Whipsnade Park

Park Manager: O. C. Chamberlain
Veterinary Officer: D. G. Ashton, MA, VetMB, MRCVS*
Office Manager: M. L. Taverner
Assistant Catering Manager: Bridget Heley
Head Gardener: J. Folds
Senior Overseer: G. Stanbridge
Overseer: J. Datlen
HEAD KEEPERS:
Central Ungulate Section: H. Stevens
Southern Ungulate Section: A. W. Billington
Northern Ungulate Section: P. J. Williams
Carnivore Section: F. Hughes
Elephant Section: J. Weatherhead
Bird Section: A. White
Children's Zoo: P. C. Milne

Consulting Staff

Consulting Architect: Sir Hugh Casson, KCVO, PRA, RDI, RIBA
Consulting Landscape Architect: Professor Sir Peter F. Shepheard, CBE, BArch, PPRIBA, MRTPI, PPILA
Honorary Herpetologist: Professor A. d'A. Bellairs, DSc, MRCS, FLS
Honorary Veterinary Consultant: A. C. L. Brown, MRCVS
Medical Referee: J. P. Horder, OBE, MA, MB, BCh, FRCP, FRCGP
Honorary Consultant Photographer: W. G. Vanderson
Consultant Typographers: Colin Banks, FSIA and John Miles, FSIA, FSTD

*Also members of the Institute of Zoology

Publications by Society's Staff and Research Workers

ABBOTT, D. H. & HEARN, J. P. (1979). The effects of neonatal exposure to testosterone on the development of behaviour in female marmoset monkeys. In *Sex hormones and behaviour:* 299–327. Sacha, A. R. (Ed.) (Ciba Symp. 62.) Amsterdam: Elsevier.

ASHTON, D. G. (1979). Mebendazole toxicity in birds. *Vet. Rec.* **105:** 109.

ASHTON, D. G. & JONES, D. M. (1978). Some diseases of captive polar mammals. *Proc. Symp. Ass. Br. Wild. Anim. Keepers* No. 3: 41.

ASHTON, D. G. & JONES, D. M. (1979). Some diseases of Przewalski horses. In *Genetics and hereditary diseases of the Przewalski horse:* 149–156. de Boer, E. M. & Bouman, J. and I. (Eds). (Foundation for the preservation and protection of the Przewalski horse.)

ASHTON, D. G., JONES, D. M., LEWIS, G. & CINDEREY, R. N. (1979). Some preliminary studies on blood and liver copper levels in ungulates at Whipsnade. *Proc. Int. Symp. Dis. Zoo & Wild Anim.* **21:** 135–144. Ippen, R. & Schroder, H. D. (Eds). Berlin: Akademie – Verlag.

BAKER, J. R., ASHTON, D. G., JONES, D. M. & NODDLE, B. (1979). Four cases of chondrodystrophy in a herd of Fallow deer. *Vet. Rec.* **104:** 450–453.

BEARDER, S. K. & MARTIN, R. D. (1979). The social organization of a nocturnal primate revealed by radio tracking. In *A handbook on biotelemetry and radio tracking.* Amlaner Jr., C. J. & Macdonald, D. W. (Eds). Oxford: Pergamon Press.

BEDFORD, J. M., MOORE, H. D. M. & FRANKLIN, L. E. (1978). Significance of the equatorial segment of the acrosome of the mammalian spermatozoon. *Expl Cell Res.* **119:** 126.

BLACK, C. D. V., WATSON, G. J. & WARD, R. J. (1978). The monitoring of Pentostam within liposomes and free drug *in vivo* and *in vitro* in experimental leishmaniasis by the measurement of antimony. *Ann. biol. Clin.* **36:** 245.

BONNEY, R. C., DIXSON, A. F. & FLEMING, D. (1979). Cyclic changes in the circulating and urinary levels of ovarian steroids in the adult female owl monkey (*Aotus trivirgatus*). *J. Reprod. Fert.* **56:** 271–280.

BOULLIN, D. J., ADAMS, C. B. T., MOHAN, J., GREEN, A. R., HUNT, R. M., DU BOULAY, G. H. & ROGERS, A. T. (1977). Effects of intracranial dopamine perfusion: behaviour arousal and reversal of cerebral arterial spasm following surgery for clipping of ruptured cerebral aneurysm. *Proc. R. Soc. Med.* **70:** 55–69.

BOULLIN, D. J., BUNTING, S., BLASO, W. P., HUNT, T. M. & MONCADA, S. (1979). Responses of human and baboon arteries to prostaglandin endoperoxides and biologically generated and synthetic prostacyclin. Their relevance to cerebral arterial spasm in man. *Br. J. clin. Pharm.* **7:** 139–147.

BUTCHER, P. D. (1979). Kinetics of the *in vitro* gelation of a sickling haemoglobin from hog deer. *Biochem. Biophys. Acta* **579:** 432–441.

CARMAN, M. (1978). The gestation and rearing periods of the Mandrill, *Mandrillus sphinx*, at the London Zoo. *Int. Zoo Yb.* **19:** 159–160.

CAVE, A. J. E. (1978). Observations upon rhinoceros cervical lymphatics. *J. Zool., Lond.* **185:** 13–26.

CAVE, A. J. E. (1979). The rhinoceros faucial and laryngopharyngeal tonsils. *J. Zool., Lond.* **187:** 471–503.

CAVE, A. J. E. (1979). The mammalian temporo-pterygoid ligament. *J. Zool., Lond.* **188:** 517–532.

CHAMBERS, P. L. & HEARN, J. P. (1979). Peripheral plasma levels of progesterone, oestradiol-17B, oestrone, testosterone, androstenedione and chorionic gonadotrophin during pregnancy in the marmoset monkey, *Callithrix jacchus*. *J. Reprod. Fert.* **56:** 23–32.

CHARLES-DOMINIQUE, P. & BEARDER, S. K. (1979). Field studies of lorisid behaviour: methodological aspects. In *The study of prosimian behaviour:* 567–629. Doyle, G. A. & Martin, R. D. (Eds). New York: Academic Press.

CRANE, G. G., GARDNER, A., HUDSON, P., HUDSON, B. & VOLLER, A. (1977). Malarial antibodies in tropical splenomegaly syndrome in Papua New Guinea. *Trans. R. Soc. trop. Med. Hyg.* **71:** 308–314.

CRAWFORD, M. A., BUDOWSKI, P. & HASSAM, A. G. (1979). Dietary management in multiple sclerosis. *Proc. nutr. Soc.* **38:** 373–389.

DELHANTY, J. D. A., MATTHEWS, J. G., WEST, L., BRIGHTELY, G., HAWKEY, C. M., ASHTON, D. G. & BIRCHER, P. (1979). Chromosome studies on 21 Przewalski horses. *Int. Zoo Yb.* **19:** 236–239.

DENT, V. E. (1979). The bacteriology of dental plaque from a variety of zoo-maintained mammalian species. *Archs Oral Biol.* **24:** 277–282.

DENT, V. E. & MARSH, P. D. (1979). The use of standardized reference antigens in the serogrouping of streptococci. *J. appl. Bact.* **46:** 473–482.

DOYLE, G. A. & BEARDER, S. K. (1977). The galagines of South Africa. In *Primate conservation:* 1–35. Prince Rainier III of Monaco & Bourne, G. H. (Eds). London: Academic Press.

DOYLE, G. A. & BEARDER, S. K. (1978). A field study of the Thick-tailed bushbaby *Galago crassicaudatus* (Primates: Lorisidae) in South Africa. In *National Geographic Society Research Reports, 1970 Projects:* 117–123. Oehser, P. H. & Lea, J. S. (Eds). Washington: National Geographic Society.

FISHER, R. A., PUTT, W., SCOTT, A. M., HAWKEY, C. M., BUTCHER, P. D., ASHTON, D. G. & BIRCHER, P. (1979). Gene markers in 40 Przewalski horses. *Int. Zoo Yb.* **19:** 228–235.

FISHER, R. A. & SCOTT, A. M. (1978). Isoelectric focusing of horse serum esterase isozymes and detection of new phenotypes. *Anim. Blood Grps biochem. Genet.* **9:** 207–213.

GOODWIN, L. (1979). Introduction: theme and objectives of the conference; *and* Conclusions: The trypanosome revisited: a summary of the conference. In *Pathogenicity of trypanosomes:* 16 & 187–188. Losos, G. & Chouinard, A. (Eds). (Proceedings of a workshop held at Nairobi, Kenya, 20–23 November 1978). Ottawa: International Development Research Centre.

GREEN, C. J., COOPER, J. E. & JONES, D. M. (1977). Cryotherapy in the reptile. *Vet. Rec.* **101:** 529.

GROVER, F. & WALLACE, P. (1979). *Laboratory organization and management.* London: Butterworth.

HASSAM, A. G., WILLIS, A. L., DENTON, J. P., STEVENS, P. & CRAWFORD, M. A. (1979). The effect of essential fatty acid deficient diet on the levels of prostaglandins and their fatty acid precursor in the rabbit brain. *Lipids* **14:** 78–80.

HAWKEY, C. (1977). The importance of comparative studies (Editorial note). *Thrombos. Haemostas (Stuttg.)* **38:** 395–397.

HAYDEN, T. J., BONNEY, R. C. & FORSYTH, I. A. (1979). Ontogeny and control of prolactin receptors in the mammary gland and liver of virgin, pregnant and lactating rats. *J. Endocr.* **80:** 259–269.

HEARN, J. P. (1979). Fertility and infertility in marmoset monkeys. In *The biology and behaviour of marmosets:* 59–64. Rothe, H., Wolters, H. J. &

Hearn, J. P. (Eds). Göttingen: Eigenverlag Rothe.

HEARN, J. P. (1979). Immunological interference with the maternal recognition of pregnancy in primates. In *Maternal recognition of pregnancy*. (Ciba Symp. No. 64). Amsterdam: Elsevier.

HEARN, J. P. (1979). Long term suppression of fertility by immunisation with hCG-β and its reversibility in female marmoset monkeys. In *Recent advances in reproduction and fertility control:* 427–438. Talwar, G. P. (Ed.). Amsterdam: Elsevier.

HEARN, J. P. & BURDEN, F. J. (1979). 'Collaborative' rearing of neonatal marmosets. *Lab. Anim.* **13:** 131–133.

HODGES, J. K. & HEARN, J. P. (1979). Long term suppression of fertility by immunisation with LHRH and its reversibility in female and male marmoset monkeys. In *Recent advances in reproduction and fertility control:* 87–98. Talwar, G. P. (Ed.). Amsterdam: Elsevier.

HOLT, W. V. (1979). Cytochemical identification of sialic acid on the surface of spermatozoa from the springbok (*Antidorcas marsupialis marsupialis*). *S. Afr. J. Sci.* **75:** 225–226.

HOLT, W. V. (1979). Development and maturation of the mammalian acrosome; a cytochemical study using phosphotungstic acid staining. *J. Ultrastruct. Res.* **68:** 58–71.

HOOKER, J. M., SMITH, G. R. & MILLIGAN, R. A. (1979). Differentiation of *Mycoplasma mycoides* subsp. *mycoides* from certain closely related caprine mycoplasmas by mycoplasmaemia and cross-protection tests in mice. *J. Hyg., Camb.* **82:** 407–418.

HULME, M. J., FEHILLY, C. B. & HEARN, J. P. (1979). The immune response to hCG-β subunit in rats and the effects of active immunisation on their fertility. *J. Reprod. Immunol.* **1:** 457–466.

HUNT, T. M., DU BOULAY, G. H., BLASO, W. P., FORSTER, D. M. C. & BOULLIN, D. J. (1979). Relationship between presence of vasoconstrictor activity in cerebrospinal fluid and time after subarachnoid haemorrhage from rupture of cerebral arterial aneurysms. *J. Neurol. Neurosurg. Psychiat.* **42:** 625–634.

HUNTER, A. J., MARTIN, R. D., DIXSON, A. F. & RUDDER, B. C. C. (1979). The duration of gestation and interbirth intervals in the owl monkey (*Aotus trivirgatus*). *Folia primatol.* **31:** 165–175.

JACKSON, O. F. & JONES, D. M. (1979). Cystine calculi in a caracal lynx (*Felis caracal*). *J. comp. Path.* **89:** 39–42.

JARMAN, D. A., DU BOULAY, G. H., KENDALL, B. & BOULLIN, D. J. (1979). Responses of baboon cerebral and extracerebral arteries to prostacyclin and prostaglandin endoperoxide *in vitro* and *in vivo*. *J. Neurol. Neurosurg. Psychiat.* **42:** 677–686.

JONES, D. M. (1977). Recent advances in the use of drugs for immobilisation capture and translocation of non-domestic animals. *Vet. A.* **17:** 280.

JONES, D. M. (1979). Disease in wild animals and its significance for man and his environment. *Jl. R. Soc. Arts* **127:** 158–168.

JONES, D. M. (1979). The husbandry and veterinary care of captive rhinoceroses. *Int. Zoo Yb.* **19:** 239–252.

JONES, D. M. & MANTON, V. J. A. (1979). Harvesting antler velvet. *Vet. Rec.* **105:** 475.

KEYMER, I. F. (1978). Diseases of chelonians: (1) Necropsy survey of tortoises. *Vet. Rec.* **103:** 548–552.

KEYMER, I. F. (1978). Diseases of chelonians: (2) Necropsy survey of terrapins and turtles. *Vet. Rec.* **103:** 577–582.

KINGSLEY, S. R. (1977). Early mother-infant behaviour in two species of Great ape, *Gorilla gorilla gorilla* and *Pongo pygmaeus pygmaeus*. *Dodo* (J. Jersey Wildlife Preservation Trust) **14:** 55–65.

KINGSLEY, S. R. & MARTIN, R. D. (1979). A case of placenta praevia in an orangutan. *Vet. Rec.* **104:** 56–67.

LEAT, W. M. F., NORTHROP, C. A., BUTTRESS, N. & JONES, D. M. (1979). Plasma lipids and lipoproteins of some members of the order Perissodactyla. *Comp. Biochem. Physiol.* **63B:** 275–281.

MANTON, V. J. A. (1978). Some observations on the management of Musk ox. *Symp. Ass. Br. Wild Anim. Keep.* 3 (Management of Polar bears and mammals in captivity).

MANTON, V. J. A. (1978). Dolphins at Whipsnade. *Zoo Newl., London*, 1978 Autumn.

MERORY, J., DU BOULAY, G. H., MARSHALL, J., MORRIS, J., ROSS-RUSSELL, R. W., SYMON, L. & THOMAS, D. J. (1978). Effect of Tinofedrine (Homburg D 8955) on cerebral blood flow in multi-infarct dementia. *J. Neurol. Neurosurg. Psychiat.* **41:** 900–902.

MOORE, H. D. M. & BEDFORD, J. M. (1979). The differential absorptive activity of epithelial cells of the rat epididymis before and after castration. *Anat. Rec.* **193:** 313–328.

MOORE, H. D. M. & BEDFORD, J. M. (1979). Short-term effects of androgen withdrawal on the structure of different epithelial cells in the rat epididymis. *Anat. Rec.* **193:** 293–312.

MORGAN-CAPNER, P., PULLEN, H. J. M., PATTISON, J. R., BIDWELL, D. E., BARTLETT, A. & VOLLER, A. (1979). A comparison of three tests for rubella antibody screening. *J. clin. Path.* **32:** 542–545.

NOADES, J. E., CORNEY, G., COOK, P. J. L., PITT, W., KING, J., FISHER, R. A., SPOWART, G., LEE, M. & BOWELL, P. J. (1979). The Scianna blood group lies distal to uridine monophosphate kinase on chromosome 1p. *Ann. Hum. Genet.* **43:** 120–131.

PALMER, N. I., THOMAS, D. J., MACGILLIVRAY, B. B., DU BOULAY, G. H., MARSHALL, J., ROSS-RUSSELL, R. W. & SYMON, L. (1977). Variations in mean cerebral blood flow under anaesthesia at rest and during cortical activation. *Stroke* **8:** 209–271.

PUTT, W. & FISHER, R. A. (1979). An investigation of seven enzymes as possible genetic markers in horse leucocytes. *Anim. Blood Grps biochem. Genet.*

RAWLINS, C. G. C. (1979). The last 25 years; an environmental summary. *Artis* **25:** 50–51.

RAWLINS, C. G. C. (1979). The breeding of White rhinos in captivity, a comparative survey. *Zool. Gart., Jena* **49:** 1–17.

RIVERS, J. P. W. & BROWN, G. A. (1979). Physiological aspects of shelter deprivation. *Disasters* **3:** 20–23.

RIVERS, J. P. W., FRANKEL, T. L., JUTTLA, S. & HAY, A. W. M. (1979). Vitamin D in the nutrition of the cat. *Proc. Nutr. Soc.* **38:** 36A.

RIVERS, J. P. W. & PAYNE, P. R. (1979). Why eating should carry a government health warning. *Nature, Lond.* **279:** 98–99.

SALIH, S. Y., BARTLETT, A. & VOLLER, A. (1978). Detection of antibodies by enzyme-immunoassay in human *Schistosoma mansoni* infections: A clinical and Chemotherapeutic study. *Tropenmed. Parasit.* **29:** 409–412.

DE SAVIGNY, D. H., VOLLER, A. & WOODRUFF, A. W. (1979). Toxocariasis: serological diagnosis by enzyme immunoassay. *J. clin. Path.* **32:** 284–288.

SMITH, G. R. & MILLIGAN, R. A. (1979). *Clostridium botulinum* in soil on the site of the former Metropolitan (Caledonian) Cattle Market, London. *J. Hyg., Camb.* **83:** 237–241.

THANAVALA, Y. M., HEARN, J. P., HAY, F. C. & HULME, M. J. (1979). Characterisation of the immunological response in marmoset monkeys immunised against hCG-β subunit and its relationship with their subsequent fertility. *J. Reprod. Immunol.* **1:** 263–274.

THOMAS, D. J., DU BOULAY, G. H., MARSHALL, J., PEARSON, T. C., ROSS-RUSSELL, R. W., SYMON, L., WETHERBY-MEIN, G. & ZILKHA, E. (1977). Cerebral blood flow in polycythaemia. *Lancet* **1977 (ii):** 161–163.

THOMAS, D. J., DU BOULAY, G. H., MARSHALL, J., PEARSON, T. C., ROSS-RUSSELL, R. W., SYMON, L., WETHERBY-MEIN, G. & ZILKHA, E. (1977). Effect of haematocrit on vertebral blood-flow in man. *Lancet* **1977 (ii):** 941–955.

THOMAS, D. J., ZILKHA, E., REDMOND, S., DU BOULAY, G. H., MARSHALL, J., ROSS-RUSSELL, R. W. & SYMON, L. (1979). An intravenous 133 Xenon

clearance technique for measuring cerebral blood flow. *J. Neurol. Sci.* **40:** 53–63.

TOOVEY, J. W. (1979). African Plains exhibit at Whipsnade Park. *Int. Zoo Yb.* **19:** 270–274.

VOLLER, A. (1978). Vaccination against tropical parasitic diseases. In *New trends and developments in vaccines:* 299–309. Voller, A. & Friedman, H. (Eds). Lancaster, England: M.T.P. Press.

VOLLER, A. (1978). The enzyme-linked immunosorbent assay (ELISA). *La Ricerca Clin. Lab.* **8:** 289–298.

VOLLER, A., BIDWELL, D. E. & BARTLETT, A. (1977). Microplate enzyme-linked immunosorbent assays in virology. In *Biomedical applications of immobilized enzymes and proteins* **2:** 119–129. Chang, T. M. S. (Ed.). London: Plenum Press.

VOLLER, A. & ENGVALL, E. (1977). Application of enzyme-linked immunosorbent assays to parasitic diseases. In *Biomedical applications of immobilized enzymes and proteins* **2:** 111–117. Chang, T-M.S. (Ed.). London: Plenum Press.

WADSWORTH, P. F. & JONES, D. M. (1979). Some abnormalities of the thyroid gland in non-domesticated birds. *Avian Path.* **8:** 279–284.

WADSWORTH, P. F., MAJEED, S. K., BRANCKER, W. M. & JONES, D. M. (1978). Some hepatic neoplasms in non-domestic birds. *Avian Path.* **7:** 551–555.

WARD, R. J., BLACK, C. D. V. & WATSON, G. J. (1979). The determination of free and liposome entrapped antimony in biological samples and its application to the chemotherapy of experimental leishmaniasis. In *Drug measurement and drug effects in laboratory health science.* (4th International Colloquium of Prospective Biology, Pont-a-Mousson, 1978). Switzerland: Karger.

WARD, R. J., BLACK, C. D. V. & WATSON, G. J. (1979). The determination of antimony in biological materials by electrothermal atomic absorption spectroscopy. *Clin. chim. Acta* **99:** 143–152.

WEARS, J. C. (1979). Moats and ditches at London and Whipsnade Zoos. *Int. Zoo Yb.* **19:** 274–280.

APPENDIX 4

Animals in the Collections

column 1	Number of animals in the Collection at 1st January 1979.
column 2	Number of animals received in 1979 by presentation, exchange, deposit, purchase or transfer between the Society's two Collections. The figures in brackets indicate animals which have been so transferred.
column 3	Number of animals born or hatched in 1979.
column 4	Number of animals which died in 1979 within 30 days of birth or hatching. The figures in brackets indicate animals born or hatched during December 1978 and which died during January 1979. Stillbirths are not included.
column 5	Number of animals which died from natural causes during 1979 apart from those included in Column 4.
column 6	Number of animals disposed of in 1979 by presentation, exchange, deposit, sale or transfer between the Society's two Collections, as well as culled animals and those killed by vermin or vandals. The figures in brackets indicate animals which have been transferred between the two Collections.
column 7	Number of animals in the Collection at 31st December 1979, showing sexes where these are known, e.g. 1/3/1 indicates 1 male, 3 female, 1 sex unknown.

Key

G Genus new to the Collection
S Species new to the Collection
SS Sub-species new to the Collection

NOTE The author and the geographical distribution are given only in the case of forms new to the Collection.

REGENT'S PARK

Mammals

		1	2	3	4	5	6	7
MONOTREMATA								
Tachyglossus aculeatus	Australian Echidna	3	—	—	—	2	—	1/0
Zaglossus bruijni	Bruijn's Echidna	3	—	—	—	—	—	0/0/3
MARSUPIALIA								
Didelphis virginiana	Virginian Opossum	4	—	—	—	2	—	0/2
Petaurus breviceps	Sugar Glider	16	—	10	—	3	1	5/4/13
Dactylopsila trivirgata	Striped Possum	2	—	—	—	—	—	1/1
Trichosurus vulpecula	Brush-tailed Possum	3	—	—	—	—	—	2/1
Sarcophilus harrisii	Tasmanian Devil	—	2	—	—	—	—	1/1
Vombatus ursinus	Common Wombat	1	—	—	—	—	—	1/0
Potorous tridactylus	Long-nosed Potoroo	6	—	2	—	—	—	5/3
Macropus parma	White-throated Wallaby	2	1	—	—	2	—	1/0
Macropus rufogriseus	Red-necked Wallaby	2	—	—	—	—	—	1/1
Macropus fuliginosus	Western Grey Kangaroo	2	—	1	1	—	—	1/1
Megaleia rufa	Red Kangaroo	6	—	1	—	3	—	1/2/1
INSECTIVORA								
Crocidura russula	Lesser White-toothed Shrew	8	—	1	—	9	—	—
CHIROPTERA								
Pteropus giganteus	Indian Fruit Bat	20	—	7	—	3	—	2/4/18
Desmodus rotundus	Vampire Bat	1	—	—	—	—	—	0/0/1
MENOTYPHLA								
Tupaia belangeri	Common Tree Shrew	15	2	11	3	—	9	6/5/5
Tupaia minor	Gunther's Tree Shrew	1	—	—	—	1	—	—
Lyonogale tana	Large Tree Shrew	4	1	3	2	—	1	3/2
PRIMATES								
Lemur fulvus	Brown Lemur	8	2	2	1	1	2	4/4
Lemur catta	Ring-tailed Lemur	7	—	—	—	—	1	3/3
Lemur variegatus	Ruffed Lemur	7	—	4	—	1	1	6/3
Cheirogaleus medius	Fat-tailed Dwarf Lemur	2	—	—	—	—	—	0/2
Microcebus murinus	Grey Mouse Lemur	5	—	2	—	—	—	3/2/2
		1	**2**	**3**	**4**	**5**	**6**	**7**

Okapi 'Papyrus' presented by the Rotterdam Zoo

APPENDIX 4

Animals in the Collections

column 1	Number of animals in the Collection at 1st January 1979.
column 2	Number of animals received in 1979 by presentation, exchange, deposit, purchase or transfer between the Society's two Collections. The figures in brackets indicate animals which have been so transferred.
column 3	Number of animals born or hatched in 1979.
column 4	Number of animals which died in 1979 within 30 days of birth or hatching. The figures in brackets indicate animals born or hatched during December 1978 and which died during January 1979. Stillbirths are not included.
column 5	Number of animals which died from natural causes during 1979 apart from those included in Column 4.
column 6	Number of animals disposed of in 1979 by presentation, exchange, deposit, sale or transfer between the Society's two Collections, as well as culled animals and those killed by vermin or vandals. The figures in brackets indicate animals which have been transferred between the two Collections.
column 7	Number of animals in the Collection at 31st December 1979, showing sexes where these are known, e.g. 1/3/1 indicates 1 male, 3 female, 1 sex unknown.

Key

G Genus new to the Collection
S Species new to the Collection
SS Sub-species new to the Collection

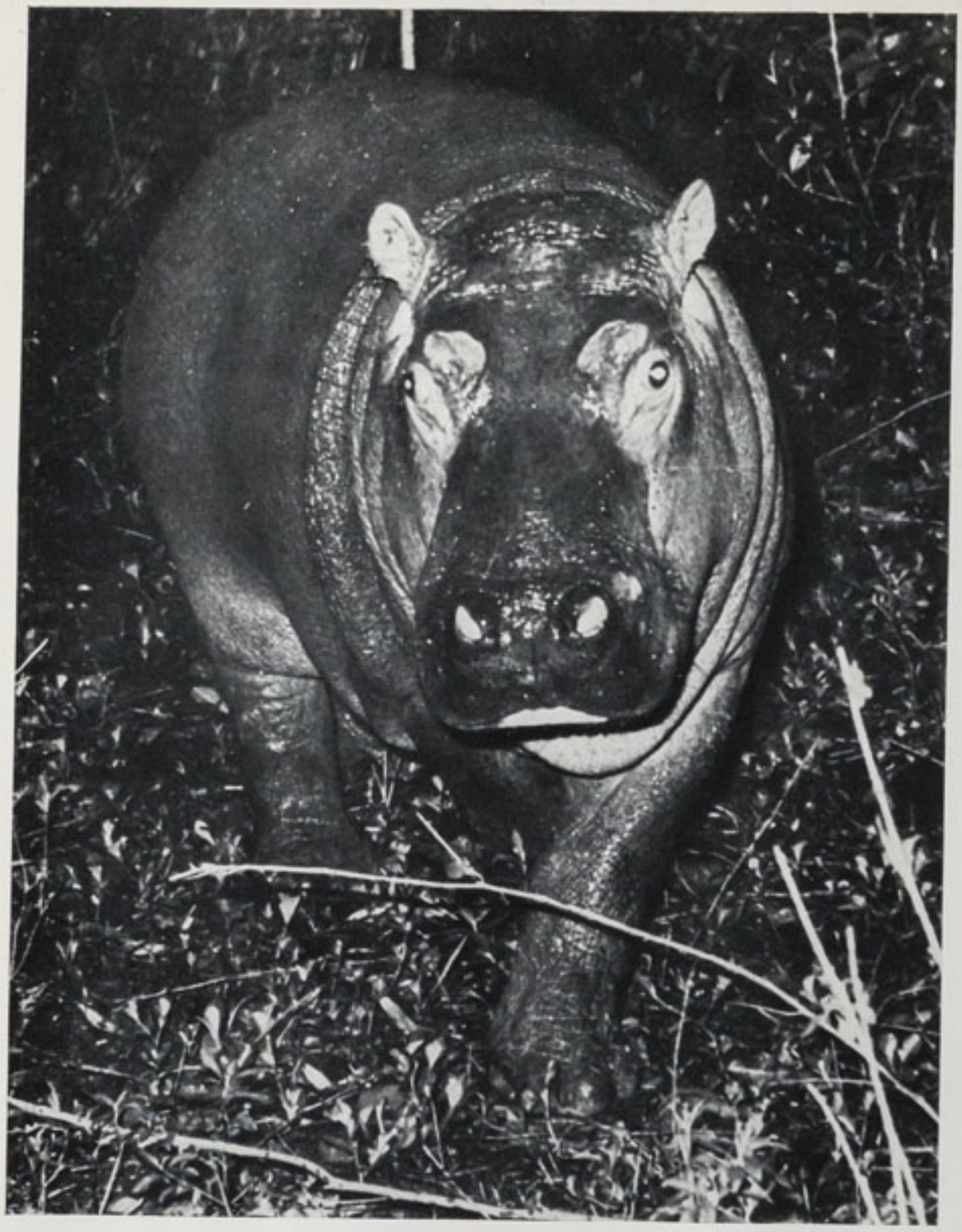
NOTE The author and the geographical distribution are given only in the case of forms new to the Collection.

REGENT'S PARK

Mammals

		1	2	3	4	5	6	7
MONOTREMATA								
Tachyglossus aculeatus	Australian Echidna	3	—	—	—	2	—	1/0
Zaglossus bruijni	Bruijn's Echidna	3	—	—	—	—	—	0/0/3
MARSUPIALIA								
Didelphis virginiana	Virginian Opossum	4	—	—	—	2	—	0/2
Petaurus breviceps	Sugar Glider	16	—	10	—	3	1	5/4/13
Dactylopsila trivirgata	Striped Possum	2	—	—	—	—	—	1/1
Trichosurus vulpecula	Brush-tailed Possum	3	—	—	—	—	—	2/1
Sarcophilus harrisii	Tasmanian Devil	—	2	—	—	—	—	1/1
Vombatus ursinus	Common Wombat	1	—	—	—	—	—	1/0
Potorous tridactylus	Long-nosed Potoroo	6	—	2	—	—	—	5/3
Macropus parma	White-throated Wallaby	2	1	—	—	2	—	1/0
Macropus rufogriseus	Red-necked Wallaby	2	—	—	—	—	—	1/1
Macropus fuliginosus	Western Grey Kangaroo	2	—	1	1	—	—	1/1
Megaleia rufa	Red Kangaroo	6	—	1	—	3	—	1/2/1
INSECTIVORA								
Crocidura russula	Lesser White-toothed Shrew	8	—	1	—	9	—	—
CHIROPTERA								
Pteropus giganteus	Indian Fruit Bat	20	—	7	—	3	—	2/4/18
Desmodus rotundus	Vampire Bat	1	—	—	—	—	—	0/0/1
MENOTYPHLA								
Tupaia belangeri	Common Tree Shrew	15	2	11	3	—	9	6/5/5
Tupaia minor	Gunther's Tree Shrew	1	—	—	—	1	—	—
Lyonogale tana	Large Tree Shrew	4	1	3	2	—	1	3/2
PRIMATES								
Lemur fulvus	Brown Lemur	8	2	2	1	1	2	4/4
Lemur catta	Ring-tailed Lemur	7	—	—	—	—	1	3/3
Lemur variegatus	Ruffed Lemur	7	—	4	—	1	1	6/3
Cheirogaleus medius	Fat-tailed Dwarf Lemur	2	—	—	—	—	—	0/2
Microcebus murinus	Grey Mouse Lemur	5	—	2	—	—	—	3/2/2
		1	**2**	**3**	**4**	**5**	**6**	**7**

Okapi 'Papyrus' presented by the Rotterdam Zoo



Young Whipsnade Hippopotamus 'Winnie' in the Mlilwane Wildlife Sanctuary in Swaziland

Pygmy Hippopotamus with baby born at Whipsnade

Tasmanian Devils presented by the Tasmanian Wildlife Service

King and Humboldt's Penguins, Whipsnade

Young Chinese Alligator received in exchange from Peking Zoo

Ringed Plover chick hatched in incubator at Regent's Park

Brown Bear cubs 'Milk' and 'Honey' born Regent's Park in January 1979

		1	2	3	4	5	6	7
Microcebus rufus	Brown Mouse Lemur	1	—	—	—	1	—	—
Loris tardigradus	Slender Loris	4	—	—	—	—	—	3/1
Nycticebus coucang	Slow Loris	10	—	1	—	—	2	3/3/3
Galago crassicaudatus	Thick-tailed Bushbaby	4	—	—	—	—	—	2/2
Galago senegalensis	Senegal Bushbaby	4	1	—	—	1	1	2/1
Aotus trivirgatus	Douroucouli	9	3	1	—	—	3	3/5/2
Pithecia pithecia	White-faced Saki Monkey	3	1	1	—	—	—	3/2
Cebus apella	Brown Capuchin	7	—	1	1	—	—	5/2
Saimiri sciureus	Squirrel Monkey	4	—	—	—	—	—	2/2
Ateles belzebuth	Long-haired Spider Monkey	2	—	1	1	2	—	—
Callithrix jacchus	Common Marmoset	6	—	—	—	—	4	1/1
Callithrix argentata	Silvery Marmoset	7	1	6	—	3	—	3/4/4
Saguinus oedipus	Cotton-headed Tamarin	8	—	1	—	—	1	2/2/4
Saguinus illigeri	Red-mantled Tamarin	9	1	6	2	1	2	4/3/4
Macaca nemestrina	Pig-tailed Macaque	17	—	5	2	—	6	5/7/2
Cercocebus atys	Sooty Mangabey	4	—	—	—	—	—	1/3
Mandrillus sphinx	Mandrill	6	—	1	—	—	—	3/4
Theropithecus gelada	Gelada Baboon	8	—	—	—	—	—	2/6
Cercopithecus pygerythrus	Vervet Monkey	8	—	1	—	1	—	4/4
Cercopithecus diana	Diana Monkey	2	—	—	—	—	—	1/1
Cercopithecus neglectus	De Brazza's Monkey	2	—	—	—	—	—	1/1
Cercopithecus talapoin	Talapoin Monkey	3	—	1	—	1	—	1/1/1
Hylobates lar	Lar Gibbon	5	—	—	—	—	—	2/3
Pongo pygmaeus	Orang Utan	9	—	1	—	—	—	5/5
Pan troglodytes	Chimpanzee	5	1 (1)	—	—	—	2 (1)	1/3
Gorilla gorilla	Gorilla (Lowland form)	4	—	—	—	—	2	1/1
EDENTATA								
Myrmecophaga tridactyla	Giant Anteater	1	1	—	—	—	—	1/1
Choloepus didactylus	Two-toed Sloth	1	—	—	—	—	—	0/1
Chaetophractus villosus	Hairy Armadillo	2	—	—	—	—	—	1/1
RODENTIA								
Ratufa bicolor	Malayan Giant Squirrel	3	—	—	—	—	—	1/2
Ratufa indica	Indian Giant Squirrel	1	—	—	—	1	—	—
Funisciurus pyrrhopus	Fire-footed Squirrel	4	—	—	—	2	—	0/2
Callosciurus erythraeus	Pallas's Squirrel	1	—	—	—	—	—	1/0
Callosciurus finlaysoni	Finlayson's Squirrel (Grey form)	1	—	—	—	—	—	0/0/1
Callosciurus prevosti	Prevost's Squirrel	—	2	—	—	—	—	1/1
Cynomys ludovicianus	Prairie Marmot	5	—	—	—	5	—	—
Tamias sibiricus	Siberian Chipmunk	5	—	1	—	—	—	3/2/1
Petaurista alborufus	Red & White Flying Squirrel	1	—	—	—	—	—	1/0
Glaucomys sabrinus	Northern Flying Squirrel	1	—	—	—	—	—	0/1
Castor fiber	Beaver	2	—	1	1	—	—	1/1
Pedetes capensis	Springhaas	1	1	—	—	—	—	0/1/1
Peromyscus maniculatus	White-footed Mouse	23	15	84	12	32	58	0/0/20
Onychomys torridus	Grasshopper Mouse	5	—	—	—	3	—	1/1
Phodopus sungorus	Dwarf Hamster	28	20	60	1	40	8	0/0/59
Cricetus cricetus	European Hamster	2	3	6	1	4	—	1/3/2
Cricetulus barabensis	Chinese Hamster	15	—	70	4	26	23	0/0/32
Lagurus lagurus	Steppe Lemming	8	6	15	6	9	—	3/4/7
Clethrionomys glareolus	Bank Vole	—	10	4	2	4	—	0/0/8
Gerbillus pyramidum	Greater Egyptian Gerbil	10	—	13	8	14	—	0/0/1
Meriones unguiculatus	Clawed Jird	7	—	73	8	8	43	0/0/21
Acomys cahirinus	Arabian Spiny Mouse	24	—	94	2	19	42	0/0/55
Arvicanthis niloticus	Nile Rat	10	—	116	—	4	87	0/0/35
Grammomys dolichurus	Long-tailed Thicket Rat	17	2	19	8	17	—	0/0/13
Mastomys natalensis	Multimammate Mouse	16	2	63	7	7	37	0/0/30
Micromys minutus	Harvest Mouse	14	10	28	2	28	4	0/0/18
Lemniscomys striatus	Striped Grass Mouse	6	—	3	3	2	—	0/0/4
Rhabdomys pumilio	Four-striped Rat	4	—	—	—	4	—	—
Notomys alexis	Brown Hopping Mouse	1	—	—	—	—	—	0/1
Pseudomys australis	Minnie Downs River Mouse	2	—	—	—	2	—	—
Glis glis	Fat Dormouse	6	—	—	—	1	—	2/1/2
Hystrix indica	Indian Porcupine	1	—	—	—	—	—	0/1
Hystrix cristata	Crested Porcupine	1	—	—	—	—	—	1/0
Hystrix indica × *H. cristata*	Hybrid Indian × Crested Porcupine	3	—	—	—	—	—	0/0/3
Atherurus africanus	African Brush-tailed Porcupine	4	—	2	2	1	—	1/0/2
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Trichys lipura	Long-tailed Porcupine	1	—	—	—	—	—	1/0
Coendou prehensilis	Brazilian Tree Porcupine	2	—	—	—	—	—	1/1
Galea musteloides	Cuis	10	2	1	1	11	—	0/1
Dolichotis patagonum	Mara	7	—	13	7	5	—	1/3/4
Cuniculus paca	Spotted Paca	2	—	—	—	—	—	1/1
Capromys pilorides	Cuban Hutia	2	—	—	—	2	—	—
Geocapromys brownii	Jamaican Hutia	2	—	—	—	1	—	1/0
Myocastor coypu	Coypu	7	—	—	—	1	—	2/4
Octodon degus	Degu	2	—	—	—	—	—	0/0/2
Proechimys guairae	Casiragua	12	—	10	1	7	2	0/0/12
CARNIVORA								
Canis lupus	Grey Wolf	2	—	—	—	—	—	2/0
Canis latrans	Coyote	2	—	—	—	—	—	1/1
Fennecus zerda	Fennec Fox	5	—	—	—	1	—	1/3
Lycaon pictus	Cape Hunting Dog	—	2 (2)	—	—	—	—	1/1
Selenarctos thibetanus	Asiatic Black Bear	2	—	—	—	—	—	0/2
Ursus arctos	Brown Bear	4	—	2	—	—	—	4/2
Ursus americanus	American Black Bear	5	—	—	—	—	3	1/1
Thalarctos maritimus	Polar Bear	2	—	—	—	—	—	1/1
Ailuropoda melanoleuca	Giant Panda	2	—	—	—	—	—	1/1
Ailurus fulgens	Red Panda	3	—	—	—	1	—	1/1
Nasua nasua	Ring-tailed Coati	3	—	1	—	2	—	0/2
Potos flavus	Kinkajou	3	—	—	—	—	—	2/1
Melogale moschata	Chinese Ferret Badger	1	—	—	—	—	—	1/0
Amblonyx cinerea	Oriental Small-clawed Otter	2	—	—	—	—	—	1/1
Genetta tigrina	Blotched Genet	2	—	—	—	1	—	1/0
Arctogalidia trivirgata	Small-toothed Palm Civet	4	—	—	—	—	—	2/2
Paguma larvata	Masked Palm Civet	2	—	—	—	1	—	1/0
Herpestes edwardsi	Indian Grey Mongoose	4	—	—	—	1	—	1/2
Cynictis penicillata	Yellow Mongoose	—	2	—	—	—	—	1/1
Felis caracal	Caracal Lynx	3	—	2	2	—	—	2/1
Felis serval	Serval	2	—	—	—	1	—	1/0
Felis wiedii	Margay	5	—	2	—	—	3	1/3
Felis concolor	Puma	1	—	—	—	—	1	—
Panthera leo	Lion	5	—	8	5	—	3	2/3
Panthera tigris	Tiger	4	2 (2)	—	—	—	1	1/4
Panthera tigris	Tiger (Siberian form)	—	2	—	—	—	2 (2)	—
Panthera pardus	Leopard (Indian form)	1	1	—	—	—	—	1/1
Panthera pardus	Leopard (Chinese form)	2	—	—	—	—	—	1/1
Panthera onca	Jaguar	2	1 (1)	—	—	—	—	2/1
Acinonyx jubatus	Cheetah	2	—	—	—	—	—	1/1
PINNIPEDIA								
Zalophus californianus	Californian Sealion	7	—	1	—	2	—	1/5
Halichoerus grypus	Grey Seal	2	1	—	—	1	—	0/2
PROBOSCIDEA								
Loxodonta africana	African Elephant	2	—	—	—	—	—	0/2
Elephas maximus	Indian Elephant	2	—	—	—	—	—	0/2
HYRACOIDEA								
Procavia capensis	Rock Hyrax	1	—	—	—	—	—	1/0
PERISSODACTYLA								
Equus przewalskii	Przewalski's Wild Horse	3	—	1	1	—	1	1/1
Asinus hemionus	Onager (Turkmen form)	2	—	1	—	—	—	2/1
Hippotigris burchelli	Common Zebra	7	—	1	—	1	—	1/6
Ceratotherium simum	White Rhinoceros	2	—	—	—	—	—	1/1
Diceros bicornis	Black Rhinoceros	3	—	—	—	—	—	2/1
ARTIODACTYLA								
Sus scrofa	Wild Boar	9	—	—	—	3	1	1/3/1
Phacochoerus aethiopicus	Wart Hog	3	—	—	—	1	—	0/2
Tayassu tajacu	Collared Peccary	4	2	—	—	1	—	2/3
Lama glama	Llama	7	—	—	—	—	—	3/4
Lama guanicoe	Guanaco	2	—	2	—	—	—	2/2
Camelus bactrianus	Bactrian Camel	7	—	—	—	1	—	2/4
Camelus dromedarius	Arabian Camel	1	—	—	—	1	—	—
Muntiacus muntjak	Indian Muntjac	6	—	3	2	2	—	2/3
Muntiacus reevesi	Reeves's Muntjac	5	—	1	—	1	2 (2)	1/2
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Cervus timorensis	Timor Deer	8	3	2	1	3	3	1/5
Pudu pudu	Pudu	3	—	1	1	—	—	2/1
Rangifer tarandus	Reindeer	3	—	—	—	—	—	1/2
Okapia johnstoni	Okapi	—	2	—	—	—	—	2/0
Giraffa camelopardalis	Giraffe	7	—	1	—	1	—	4/3
Tragelaphus strepsiceros	Greater Kudu	6	—	1	1	1	—	1/4
Anoa depressicornis	Anoa	1	—	—	—	—	—	1/0
Bos gaurus	Gaur	—	4	—	—	—	—	2/2
Bos grunniens	Yak	7	—	—	—	—	7 (2)	—
Syncerus caffer	African Buffalo (Dwarf Forest form)	7	—	—	—	—	7	—
Bison bison	American Bison	7	—	—	—	—	1	2/4
Kobus ellipsiprymnus	Common Waterbuck	2	—	1	1	—	—	1/1
Hippotragus niger	Sable Antelope	3	2	—	—	—	3	0/2
Oryx gazella	Gemsbok	2	3	—	—	1	1	1/2
Oryx tao	Scimitar-horned Oryx	8	2 (2)	3	—	3	2 (2)	3/5
Antilope cervicapra	Blackbuck	28	—	14	4	—	10 (3)	5/23
Gazella dama	Dama Gazelle	—	2	—	—	—	—	1/1
Capra falconeri	Markhor	9	—	3	2	1	1	4/4
Ammotragus lervia	Barbary Sheep	34	—	12	12	3	8	7/16
Ovis musimon	Mouflon	24	—	9	3	6	1	6/17
Ovis canadensis	Bighorn Sheep	3	—	—	—	1	—	2/0
DOMESTIC								
	Pigs: Gloucester Old Spot	3	—	18	6	2	10	1/2
	Vietnamese Pot-bellied	2	—	—	—	—	—	1/1
	Cattle	4	—	2	—	—	1	0/5
	Goat	8	—	11	1	2	12	0/4
	Goat—Golden Guernsey	4	—	2	—	—	1	2/3
	Dorset Down Sheep	8	—	8	4	—	2	1/9
	Rabbit	28	—	12	—	1	26	0/0/13
	Guineapig	49	8	55	—	7	81	0/0/24
	Donkey	6	—	—	—	—	—	3/3
	Pony	4	—	—	—	—	—	0/4
	Total–Mammals	990	129 (8)	927	135	351	536 (12)	1024

Birds

STRUTHIONIFORMES								
Struthio camelus	Ostrich	2	—	—	—	—	—	1/1
CASUARIIFORMES								
Casuarius bennetti	Bennett's Cassowary	1	—	—	—	—	—	0/1
Casuarius unappendiculatus	One-wattled Cassowary	1	—	—	—	—	—	1/0
Dromiaus novaehollandiae	Emu	2	—	—	—	—	—	1/1
SPHENISCIFORMES								
Pygoscelis papua	Gentoo Penguin	2	—	—	—	—	—	0/0/2
Eudyptes crestatus	Rockhopper Penguin	6	—	—	—	—	—	2/1/3
Spheniscus demersus	Black-footed Penguin	15	—	—	—	3	—	2/2/8
Spheniscus humboldti	Humboldt's Penguin	6	—	—	—	—	—	4/2
PELECANIFORMES								
Pelecanus onocrotalus	Eastern White Pelican	4	—	—	—	—	—	0/0/4
Pelecanus crispus	Crested Pelican	2	—	—	—	1	—	0/0/1
Pelecanus occidentalis	Brown Pelican	7	—	—	—	—	—	0/0/7
Morus bassanus	Gannet	1	1 (1)	—	—	—	—	0/0/2
Phalacrocorax carbo	Cormorant	6	—	—	—	1	—	2/1/2
Phalacrocorax aristotelis	Shag	3	—	—	—	—	—	2/1
CICONIIFORMES								
Nycticorax nycticorax	Night Heron	5	—	2	—	2	—	0/1/4
Cochlearius cochlearius	Boatbill	2	—	—	—	—	—	0/0/2
Ardeola ibis	Cattle Egret	14	—	1	—	5	—	3/4/3
Butorides striatus	Striated Heron	1	—	—	—	—	—	0/0/1
Ardea cinerea	Grey Heron	6	—	—	—	—	—	0/0/6
Ciconia abdimii	Abdim's Stork	10	—	2	—	—	—	3/4/5
Ciconia ciconia	White Stork	3	—	—	—	—	—	1/1/1
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Ephippiorhynchus asiaticus	Black-necked Stork	2	—	—	—	—	—	1/1
Leptoptilos crumeniferus	Marabou Stork	2	—	—	—	1	1	—
Threskiornis aethiopicus	Sacred Ibis	15	1 (1)	10	2	1	—	3/5/15
Carphibis spinicollis	Straw-necked Ibis	3	—	—	—	—	—	1/1/1
Pseudibis papillosa	Black Ibis	1	—	—	—	1	—	—
Eudocimus albus	White Ibis	5	—	—	—	2	—	2/0/1
Eudocimus ruber	Scarlet Ibis	6	—	—	—	1	—	2/1/2
Platalea leucorodia	Spoonbill	3	—	—	—	2	—	0/0/1
Phoenicopterus ruber roseus	Greater Flamingo	11	—	—	—	—	—	0/0/11
Phoenicopterus ruber ruber	Rosy Flamingo	8	—	—	—	1	—	0/0/7
Phoenicopterus chilensis	Chilean Flamingo	32	—	2	—	2	—	10/8/14
Phoeniconaias minor	Lesser Flamingo	16	—	—	—	—	—	0/0/16
ANSERIFORMES								
Dendrocygna bicolor	Fulvous Whistling Duck	5	—	—	—	1	1	2/1
Dendrocygna arborea	Cuban Tree Duck	—	2	—	—	—	—	0/0/2
Dendrocygna autumnalis	Red-billed Whistling Duck	8	—	—	—	—	1	4/3
Anser fabalis brachyrhynchus	Pink-footed Goose	1	—	—	—	—	—	1/0
Anser caerulescens atlanticus	Greater Snow Goose	3	—	—	—	—	—	1/2
Anser canagicus	Emperor Goose	2	—	—	—	—	—	1/1
Branta sandvicensis	Hawaiian Goose	6	—	—	—	—	—	4/2
Branta leucopsis	Barnacle Goose	5	2	—	—	—	—	3/2/2
Branta bernicla crientalis	Brent Goose	4	—	1	—	—	—	2/2/1
Branta ruficollis	Red-breasted Goose	2	—	—	—	—	—	1/1
Cereopsis novaehollandiae	Cape Barren Goose	2	2 (2)	—	—	—	2 (2)	1/1
Tadorna tadorna	Shelduck	3	5	—	—	—	—	4/4
Aix sponsa	Carolina Duck	9	4	—	—	—	—	7/6
Aix galericulata	Mandarin Duck	9	3	—	—	1	—	7/4
Callonetta leucophrys	Ringed Teal	2	—	—	—	1	—	1/0
Anas penelope	Wigeon	5	—	6	1	1	—	2/3/4
Anas sibilatrix	Chiloe Wigeon	10	—	—	—	—	—	8/2
Anas strepera	Gadwall	—	4	—	—	—	—	2/2
Anas crecca	Teal	2	—	3	—	—	—	3/2
Anas capensis	Cape Teal	1	—	—	—	—	—	1/0
Anas platyrhynchus laysanensis	Laysan Duck	3	1	—	—	1	—	1/1/1
Anas acuta	Pintail	8	—	4	—	2	—	5/5
Anas bahamensis	Bahama Pintail	1	—	—	—	—	—	1/0
Anas querquedula	Garganey	2	—	—	—	—	1	1/0
Anas clypeata	Shoveler	9	1	—	—	2	—	2/6
Marmaronetta angustirostris	Marbled Teal	4	—	—	—	—	1	2/1
Netta rufina	Red-crested Pochard	4	—	—	—	1	—	2/1
Aythya ferina	Pochard	1	—	—	—	—	—	0/1
Aythya fuligula	Tufted Duck	4	—	2	—	1	—	0/3/2
Somateria mollissima	Eider Duck	6	2	—	—	—	1	3/4
Bucephala clangula	Goldeneye	2	—	—	—	—	—	1/1
Mergus cucullatus	Hooded Merganser	2	—	—	—	—	—	1/1
Oxyura jamaicensis	North American Ruddy Duck	5	—	—	—	—	—	3/2
FALCONIFORMES								
Vultur gryphus	Great Condor	2	—	—	—	—	—	1/1
Milvus migrans migrans	Black Kite	1	—	—	—	—	—	0/0/1
Milvus migrans parasitus	African Black Kite	1	—	—	—	—	—	0/1
Haliastur indus	Brahminy Kite	1	—	—	—	—	—	0/0/1
Haliastur indus intermedius	Javan Brahminy Kite	1	—	—	—	—	—	0/0/1
Haliaeetus vocifer	Fish Eagle	2	—	—	—	—	—	1/1
Neophron percnopterus percnopterus	Egyptian Vulture	2	—	—	—	—	—	1/1
Gyps rueppellii	Ruppell's Griffon Vulture	1	—	—	—	—	—	0/0/1
Gyps fulvus	Griffon Vulture	1	1	—	—	—	—	0/0/2
Torgos tracheliotus	Lappet-faced Vulture	1	—	—	—	—	—	0/0/1
Circaetus gallicus gallicus	Short-toed Eagle	1	—	—	—	—	—	0/1
Terathopius ecaudatus	Bateleur Eagle	1	1	—	—	—	—	1/1
Spilornis cheela ricketti	Chinese Serpent Eagle	2	—	—	—	—	—	1/1
Polyboroides typus	Harrier Hawk	2	—	—	—	—	—	1/1
Butastur rufipennis	Grasshopper Buzzard	1	—	—	—	—	—	0/0/1
Heterospizias meridionalis	Savannah Hawk	1	—	—	—	—	—	0/0/1
Geranoaetus melanoleucus	Chilean Eagle	1	—	—	—	—	—	1/0
Buteo buteo	Buzzard	2	—	—	—	1	—	0/0/1
Aquila rapax	Tawny Eagle	3	—	—	—	—	—	2/1
Aquila rapax orientalis	Western Steppe Eagle	1	—	—	—	—	—	1/0
Aquila heliaca	Imperial Eagle	1	—	—	—	—	—	0/0/1
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Aquila wahlbergi	Wahlberg's Eagle	1	—	—	—	—	—	0/0/1
Aquila chrysaetos	Golden Eagle	1	—	—	—	—	—	1/0
Polyborus plancus brasiliensis	Brazilian Carrion Hawk	2	—	—	—	—	—	2/0
Polyborus plancus cheriway	Cheriway Carrion Hawk	2	—	—	—	—	—	0/0/2
Falco cenchroides	Nankeen Kestrel	1	—	—	—	—	—	0/0/1
Falco chicquera	Red-headed Merlin	1	—	—	—	—	—	0/0/1
Falco biarmicus	Lanner Falcon	1	—	—	—	—	—	0/1
GALLIFORMES								
Crax globulosa	Globose Curassow	1	—	—	—	—	—	1/0
Lophortyx californica	Californian Quail	1	—	—	—	—	—	1/0
Alectoris rufa	Red-legged Partridge	1	—	—	—	—	—	0/0/1
Coturnix coturnix japonica	Japanese Quail	2	—	—	—	—	1	0/0/1
Excalfactoria chinensis	Chinese Painted Quail	3	—	7	—	2	—	2/1/5
Rollulus rouloul	Crested Wood Partridge (Roul Roul)	—	2	—	—	—	—	1/1
Lophophorus impeyanus	Impeyan Pheasant	2	—	—	—	—	—	1/1
Gallus sonneratii	Sonnerat's Jungle Fowl	7	—	7	—	2	6 (6)	2/4
Lophura leucomelana leucomelana	Nepal Kalij Pheasant	3	—	—	—	—	—	2/1
Lophura leucomelana melanota	Black-backed Kalij Pheasant	1	—	—	—	—	—	1/0
Lophura nycthemera	Silver Pheasant	2	—	3	—	—	3	1/1
Lophura imperialis	Imperial Pheasant	5	—	3	—	1	—	5/2
Lophura swinhoii	Swinhoe's Pheasant	1	1	2	—	—	2	1/1
Lophura diardi	Siamese Fire-back Pheasant	2	—	—	—	—	—	1/1
Crossoptilon crossoptilon	White Eared Pheasant	2	—	—	—	—	—	1/1
Crossoptilon mantchuricum	Brown Eared Pheasant	4	—	—	—	—	—	1/1/2
Crossoptilon auritum	Blue Eared Pheasant	2	—	—	—	—	—	1/1
Catreus wallichi	Cheer Pheasant	1	2	—	—	1	—	1/1
Syrmaticus ellioti	Elliot's Pheasant	4	1	4	—	—	2	4/1/2
Syrmaticus mikado	Mikado Pheasant	5	—	18	—	4	16	1/1/1
Syrmaticus reevesi	Reeves's Pheasant	3	—	—	—	—	—	2/1
Phasianus colchicus	Common Pheasant	1	—	—	—	—	—	1/0
Chrysolophus pictus	Golden Pheasant	1	—	—	—	1	—	—
Chrysolophus amherstiae	Lady Amherst's Pheasant	3	—	—	—	—	—	2/1
Polyplectron emphanum	Palawan Peacock Pheasant	1	—	—	—	—	1	—
Argusianus argus	Argus Pheasant	2	—	—	—	—	—	1/1
Pavo cristatus	Common Peafowl	4	—	—	—	—	—	2/2
Numida meleagris	Helmeted Guineafowl							
GRUIFORMES								
Grus japonensis	Manchurian Crane	—	1 (1)	—	—	—	—	0/0/1
Grus antigone	Sarus Crane	4	—	—	—	1	—	1/2
Grus rubicunda	Brolga	1	—	—	—	—	—	0/1
Anthropoides virgo	Demoiselle Crane	4	—	—	—	—	—	0/0/4
Anthropoides paradisea	Stanley Crane	3	1	—	—	—	—	2/1/1
Balearica pavonina	West African Crowned Crane	2	—	—	—	—	—	1/1
Balearica regulorum	South African Crowned Crane	3	—	—	—	—	1 (1)	1/1
Rallus philippensis	Banded Rail	2	—	—	—	1	—	0/0/1
Rallus torquatus torquatus	Philippine Rail	1	—	—	—	1	—	—
Aramides axillaris	Venezuelan Wood Rail	1	—	—	—	—	—	0/0/1
Aramides cajanea × *A. axillaris*	Hybrid Cayenne Wood Rail × Venezuelan Wood Rail	1	—	—	—	—	—	0/1
Porphyrula alleni	Allen's Gallinule	1	—	—	—	—	—	0/0/1
Porphyrio poliocephalus	Grey-headed Gallinule	6	—	—	—	1	2	2/1
Lissotis melanogaster melanogaster	Black-bellied Bustard	1	—	—	—	—	—	0/0/1
CHARADRIIFORMES								
Haematopus ostralegus	Oystercatcher	8	2	—	—	—	2	1/1/6
Himantopus himantopus	Black-winged Stilt	4	—	—	—	2	1	0/0/1
Recurvirostra avosetta	Avocet	1	—	—	—	—	—	0/0/1
Glareola pratincola	Collared Pratincole	2	—	—	—	—	—	0/0/2
Vanellus vanellus	Lapwing	2	—	—	—	—	1	0/0/1
Vanellus spinosus	Spur-winged Plover	2	—	—	—	1	—	0/0/1
Vanellus tricolor	Banded Plover	3	—	—	—	—	—	0/1/2
Pluvialis apricaria	Golden Plover	2	—	—	—	—	1	0/0/1
Charadrius hiaticula	Ringed Plover	4	—	1	—	1	1	0/0/3
Numenius arquata	Curlew	3	—	—	—	—	—	0/0/3
Tringa totanus	Redshank	2	—	—	—	1	—	0/1
Philomachus pugnax	Ruff	10	—	3	—	4	2	4/3
Catharacta skua antarctica	Antarctic Skua	2	—	—	—	—	—	0/1/1
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Larus cirrocephalus poiocephalus	Grey-headed Gull	15	—	7	—	—	7	4/4/7
Larus novaehollandiae	Silver Gull	4	—	—	—	—	—	1/1/2
Sterna bergii	Crested Tern	1	—	—	—	—	—	0/0/1
Larosterna inca	Inca Tern	6	—	—	—	—	—	1/1/4
Alca torda	Razorbill	2	—	—	—	1	—	0/0/1
Uria aalge	Guillemot	3	—	—	—	—	—	0/0/3
COLUMBIFORMES								
Columba livia	Rock Dove	—	1	—	—	—	—	0/0/1
Columba guinea	Speckled Pigeon	26	—	4	—	2	9	9/5/5
Columba picazuro	Picazuro Pigeon	5	—	—	—	—	—	1/1/3
Columba corensis	Naked-eyed Pigeon	1	—	—	—	—	—	0/0/1
Streptopelia turtur	Turtle Dove	2	—	—	—	—	—	0/0/2
Streptopelia decaocto roseogrisea	Pink-headed Dove	2	—	—	—	—	—	0/0/2
Streptopelia capicola	Ring-necked Dove	2	—	—	—	—	—	0/0/2
Streptopelia tranquebarica humilis	Dwarf Turtle Dove	—	1	—	—	—	—	0/0/1
Streptopelia chinensis chinensis	Chinese Necklace Dove	14	—	3	1	4	—	3/3/6
Macropygia ruficeps	Little Cuckoo Dove	1	—	—	—	—	—	0/0/1
Chalcophaps indica	Green-winged Dove	1	—	—	—	—	—	0/0/1
Phaps elegans	Brush Bronze-winged Pigeon	5	—	—	—	—	—	0/1/4
Ocyphaps lophotes	Crested Pigeon	4	—	—	—	2	2	—
Geopelia cuneata	Diamond Dove	2	—	—	—	—	—	0/0/2
Geopelia striata striata	Zebra Dove	1	—	—	—	1	—	—
Geopelia humeralis	Barred-shouldered Dove	1	—	—	—	1	—	—
Zenaida auriculata	Violet-eared Dove	5	—	—	—	1	—	0/0/4
Geotrygon versicolor	Mountain Witch Dove	9	—	—	—	3	2	0/1/3
Caloenas nicobarica	Nicobar Pigeon	1	—	—	—	—	1	—
Goura cristata	Blue Crowned Pigeon	2	—	—	—	1	—	0/0/1
Ducula carola carola	Grey-breasted Fruit Pigeon	1	—	—	—	—	—	0/0/1
Ducula aenea	Green Imperial Pigeon	1	—	—	—	—	—	0/0/1
Ducula badia cuprea	Jerdon's Imperial Pigeon	4	—	1	—	—	—	1/1/3
Ducula bicolor	Pied Imperial Pigeon	1	—	—	—	—	—	0/0/1
PSITTACIFORMES								
Chalcopsitta sintillata	Yellow-streaked Lory	1	—	—	—	—	—	0/0/1
Eos cyanogenia	Black-winged Lory	1	—	—	—	—	—	0/0/1
Pseudeos fuscata	Dusky Lory	2	2	—	—	2	1	0/0/1
Trichoglossus ornatus	Ornate Lorikeet	1	—	—	—	—	—	0/0/1
Trichoglossus euteles	Perfect Lorikeet	1	—	—	—	—	—	0/0/1
Lorius lory erythrothorax	Red-breasted Lory	1	—	—	—	—	—	0/0/1
Lorius domicellus	Purple-capped Lory	1	—	—	—	—	—	0/1
Lorius garrulus	Scarlet Lory	1	—	—	—	—	1	—
Lorius garrulus × *Lorius domicellus*	Scarlet Lory × Purple-capped Lory	1	—	—	—	—	—	0/0/1
Lorius garrulus flavopalliatus	Yellow-backed Lory	1	—	—	—	—	—	0/0/1
Probosciger aterrimus intermedius	Aru Islands Palm Cockatoo	1	—	—	—	—	—	0/1
Calyptorhynchus funereus	Funereal Cockatoo	1	—	—	—	—	—	0/0/1
Calyptorhynchus magnificus magnificus	Banksian Cockatoo	1	—	—	—	1	—	—
Callocephalon fimbriatum	Gang Gang Cockatoo	1	—	—	—	—	—	1/0
Eolophus roseicapillus	Roseate Cockatoo	—	2	—	—	—	—	0/0/2
Cacatua leadbeateri	Leadbeater's Cockatoo	2	—	—	—	—	—	1/0/1
Cacatua sulphurea	Lesser Sulphur-crested Cockatoo	3	—	—	—	—	—	1/1/1
Cacatua sulphurea parvula	Dwarf Sulphur-crested Cockatoo	1	—	—	—	—	—	0/0/1
Cacatua galerita galerita	Greater Sulphur-crested Cockatoo	3	—	—	—	1	—	1/1
Cacatua moluccensis	Moluccan Cockatoo	1	—	—	—	—	—	1/0
Cacatua alba	White-crested Cockatoo	2	—	—	—	—	—	1/1
Cacatua sanguinea sanguinea	Bare-eyed Cockatoo	3	—	—	—	—	—	1/1/1
Cacatua tenuirostris pastinator	Western Slender-billed Cockatoo	5	—	—	—	—	—	0/0/5
Nymphicus hollandicus	Cockatiel	20	—	—	—	5	—	7/3/5
Nestor notabilis	Kea	2	—	—	—	—	—	1/1
Tanygnathus mulleri mulleri	Muller's Blue-backed Parrot	1	—	—	—	—	—	0/1
Eclectus roratus	Eclectus Parrot	2	—	—	—	—	—	1/1
Polytelis alexandrae	Queen Alexandra's Parrakeet	1	—	—	—	1	—	—
Platycercus eximius eximius	Eastern Rosella Parrakeet	2	1	—	—	—	—	1/0/2
Platycercus adscitus palliceps	Mealy Rosella Parrakeet	1	—	—	—	1	—	—
Psephotus haematonotus	Red-rumped Parrakeet	2	—	—	—	—	—	1/1
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Neophema pulchella	Turquoisine Parrakeet	1	—	—	—	1	—	—
Coracopsis vasa	Vasa Parrot	1	—	—	—	—	—	0/1
Psittacus erithacus	Grey Parrot	5	—	—	—	1	—	0/1/3
Psittacus erithacus timneh	Sierra Leone Parrot	1	—	—	—	1	—	—
Poicephalus robustus suahelicus	Cape Parrot	1	—	—	—	—	—	0/1
Poicephalus gulielmi aubryanus	Aubry's Parrot	1	—	—	—	—	—	0/0/1
Poicephalus cryptoxanthus cryptoxanthus	Southern Brown-headed Parrot	2	—	—	—	—	—	0/0/2
Poicephalus senegalus	Yellow-vented Senegal Parrot	1	—	—	—	—	—	0/1
Poicephalus senegalus versteri	Orange-bellied Senegal Parrot	3	1	—	—	—	—	0/0/4
Poicephalus rueppellii	Ruppell's Parrot	2	—	—	—	—	—	1/0/1
Agapornis roseicollis	Rosy-faced Lovebird	3	—	—	—	1	—	1/1
Agapornis fischeri	Fischer's Lovebird	24	—	12	1	6	2	8/7/12
Loriculus vernalis	Vernal Hanging Parrot	1	—	—	—	—	—	0/0/1
Psittacula eupatria nipalensis	Alexandrine Parrakeet	2	—	—	—	—	—	1/1
Psittacula krameri krameri	African Ring-necked Parrakeet	4	—	—	—	—	—	1/2/1
Psittacula krameri manillensis	Indian Ring-necked Parrakeet	2	—	3	—	—	—	2/2/1
Psittacula cyanocephala	Plum-headed Parrakeet	2	1	4	—	—	3	2/1/1
Psittacula alexandri alexandri	Javan Parrakeet	1	—	—	—	—	—	0/0/1
Anodorhynchus hyacinthinus	Hyacinthine Macaw	3	—	—	—	1	—	1/1
Ara ararauna	Blue and Yellow Macaw	3	—	—	—	1	—	0/2
Ara macao	Scarlet Macaw	2	—	—	—	—	—	1/1
Ara chloroptera	Green-winged Macaw	3	—	—	—	—	—	2/1
Ara severa severa	Severe Macaw	2	—	—	—	—	—	1/1
Ara maracana	Illiger's Macaw	1	—	—	—	1	—	—
Ara nobilis nobilis	Hahn's Macaw	1	—	—	—	—	—	0/0/1
Aratinga erythrogenys	Red-masked Conure	1	—	—	—	—	—	0/0/1
Aratinga jandaya	Yellow-headed Conure	2	—	—	—	1	—	0/0/1
Aratinga solstitialis	Sun Conure	—	4	—	—	1	—	0/0/3
Rhynchopsitta pachyrhyncha	Thick-billed Parrot	2	—	—	—	—	—	0/0/2
Cyanoliseus patagonus byroni	Greater Patagonian Conure	—	2	—	—	—	—	0/0/2
Myiopsitta monachus	Quaker Parrakeet	—	1	—	—	1	—	—
Brotogeris versicolurus chiriri	Canary-winged Parrakeet	7	1	—	—	2	1	2/1/2
Brotogeris pyrrhopterus	Orange-flanked Parrakeet	4	—	—	—	—	—	0/1/3
Pionites melanocephala	Back-headed Caique	1	—	—	—	—	—	0/0/1
Pionus menstruus	Red-vented Parrot	1	—	—	—	—	—	0/0/1
Amazona albifrons	White-browed Amazon Parrot	2	—	—	—	1	—	0/0/1
Amazona agilis	Active Amazon Parrot	1	—	—	—	—	—	0/1
Amazona autumnalis	Yellow-cheeked Amazon Parrot	1	—	—	—	—	1	—
Amazona festiva	Festive Amazon Parrot	2	—	—	—	—	—	1/1
Amazona aestiva	Blue-fronted Amazon Parrot	2	—	—	—	—	—	0/0/2
Amazona ochrocephala	Yellow-fronted Amazon Parrot	1	—	—	—	—	—	0/0/1
Amazona amazonica	Orange-winged Amazon Parrot	2	—	—	—	—	—	0/0/2
Amazona farinosa	Mealy Amazon Parrot	1	—	—	—	—	—	0/0/1
CUCULIFORMES								
Corythaixoides concolor	Grey Go-Away Bird	3	—	—	—	2	—	0/0/1
Tauraco corythaix corythaix	Knysna Turaco	1	—	—	—	—	—	1/0
Tauraco corythaix persa	West African Turaco	2	—	—	—	—	—	0/0/2
Tauraco corythaix livingstonii	Livingstone's Turaco	1	—	—	—	—	—	0/0/1
Tauraco erythrolophus	Red-crested Turaco	2	—	—	—	—	—	0/0/2
Tauraco hartlaubi	Hartlaub's Turaco	2	—	—	—	1	—	0/0/1
Tauraco leucotis leucotis	White-cheeked Turaco	8	—	4	—	1	—	1/1/9
Eudynamys scolopacea chinensis	Chinese Koel	1	—	—	—	—	—	0/0/1
STRIGIFORMES								
Tyto alba	Barn Owl	2	2	—	—	—	2	1/1
Otis leucotis	White-faced Scops Owl	3	—	—	—	—	—	0/0/3
Bubo virginianus	Great Horned Eagle Owl	2	—	—	—	—	—	1/1
Bubo bubo bubo	Great Eagle Owl	2	—	2	—	1	1	1/1
Bubo bubo omissus	Turkmenian Eagle Owl	2	—	—	—	—	—	0/0/2
Bubo bubo ascalaphus	Savigny's Eagle Owl	1	—	—	—	—	—	1/0
Bubo bubo bengalensis	Indian Eagle Owl	2	—	—	—	—	—	1/1
Bubo capensis mackinderi	Kenya Eagle Owl	2	—	—	—	—	—	1/1
Bubo africanus	Spotted Eagle Owl	2	—	—	—	1	—	0/1
Bubo africanus cinerascens	Abyssinian Spotted Eagle Owl	2	—	2	—	—	2	1/1
Bubo poensis	Fraser's Eagle Owl	2	—	—	—	—	—	0/0/2
Bubo vosseleri	Nduk Eagle Owl	3	—	—	—	—	—	0/0/3
Ketupa zeylonensis	Brown Fish Owl	1	—	—	—	—	—	0/0/1
Ketupa ketupu	Javan Fish Owl	4	—	—	—	—	—	1/1/2
Scotopelia bouvieri	Vermiculated Fishing Owl	2	—	—	—	—	—	0/0/2
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Pulsatrix perspicillata	Spectacled Owl	2	—	—	—	—	—	1/0/1
Nyctea scandiaca	Snowy Owl	2	—	3	—	—	2	1/1/1
Ninox novaeseelandiae	Boobook Owl	2	1	—	—	—	1	0/0/2
Athene noctua	Little Owl	6	—	4	—	—	8	1/1
Speotyto cunicularia	Burrowing Owl	3	—	1	—	—	—	1/1/2
Ciccaba woodfordii	African Wood Owl	2	—	—	—	—	—	1/1
Strix aluco sylvatica	Tawny Owl	4	—	—	—	—	2	1/1
Asio flammeus	Short-eared Owl	2	1	—	—	—	2	0/0/1
Aegolius funereus	Tengmalm's Owl	1	—	—	—	—	—	0/0/1
APODIFORMES								
Amazilia amabilis	Blue-chested Hummingbird	1	—	—	—	—	1	—
Colibri delphinae	Brown Violet-eared Hummingbird	—	4	—	—	2	—	0/0/2
Boissoneaua flavescens	Buff-tailed Coronet	—	2	—	—	1	—	0/0/1
CORACIIFORMES								
Dacelo novaeguinea	Kookaburra	2	1 (1)	—	—	1	—	0/0/2
Momotus momota	Blue-crowned Motmot	1	—	—	—	—	—	0/0/1
Coracias caudata	Lilac-breasted Roller	1	—	—	—	—	—	0/0/1
Coracias benghalensis	Indian Roller	1	—	—	—	—	—	0/0/1
Tockus birostris	Indian Grey Hornbill	2	—	—	—	2	—	—
Tockus alboterminatus	Crowned Hornbill	3	—	—	—	1	—	0/0/2
Tockus erythrorhynchus	Red-billed Hornbill	5	—	3	—	3	—	0/1/4
Tockus deckeni jacksoni	Jackson's Hornbill	5	—	—	—	1	—	2/2
Penelopides panini	Tarictic Hornbill	5	—	2	—	—	—	4/3
Aceros undulatus	Wreathed Hornbill	1	—	—	—	—	—	0/1
Anthracoceros malayanus	Black Hornbill	2	—	—	—	—	—	1/1
Anthracoceros coronatus convexus	Southern Pied Hornbill	1	—	—	—	—	—	0/1
Bycanistes bucinator	Trumpeter Hornbill	2	—	—	—	—	—	1/1
Bycanistes subcylindricus	Black and White Casqued Hornbill	2	—	—	—	—	—	1/1
Ceratogymna atrata	Black Casqued Hornbill	1	—	—	—	1	—	—
Buceros bicornis	Great Indian Hornbill	2	—	—	—	—	—	1/1
Buceros hydrocorax	Rufous Hornbill	4	—	—	—	—	—	1/1/2
PICIFORMES								
Psilopogon pyrolophus	Fire-tufted Barbet	1	1	—	—	—	—	0/0/2
Megalaima mystacophanos	Gaudy Barbet	1	—	—	—	—	—	0/1
Tricholaema lacrymosum	Spotted-flanked Barbet	4	—	—	—	1	1	2/0
Tricholaema diadematum	Red-fronted Barbet	1	—	—	—	—	—	0/0/1
Lybius guifsobalito	Black-billed Barbet	4	—	—	—	2	—	0/1/1
Lybius bidentatus	Double-toothed Barbet	3	—	—	—	—	—	1/1/1
Trachyphonus erythrocephalus	Red and Yellow Barbet	2	—	—	—	—	—	0/2
Trachyphonus darnaudii	D'Arnaud's Barbet	2	—	—	—	1	—	0/1
Andigena laminirostris	Laminated Hill Toucan	2	—	—	—	—	—	0/0/2
Ramphastos vitellinus ariel	Ariel Toucan	2	—	—	—	—	—	0/0/2
Ramphastos vitellinus culinatus	Yellow-ridged Toucan	1	—	—	—	—	—	0/0/1
Ramphastos toco	Toco Toucan	2	—	—	—	—	—	1/1
Ramphastos tucanus	Red-billed Toucan	1	—	—	—	—	—	0/0/1
Ramphastos ambiguus swainsonii	Swainson's Toucan	1	—	—	—	1	—	—
Melanerpes candidus	White Woodpecker	—	2	—	—	—	—	1/1
Dinopium benghalense	Golden-backed Woodpecker	1	—	—	—	—	—	0/0/1
PASSERIFORMES								
Procnias nudicollis	Naked-throated Bellbird	1	—	—	—	—	—	1/0
Chiroxiphia pareola	Blue-backed Manakin	1	—	—	—	—	1	—
Pitta guajana	Banded Pitta	1	—	—	—	—	—	0/1
Alauda arvensis	Skylark	—	1	—	—	—	—	0/0/1
Motacilla alba	Pied Wagtail	1	—	—	—	—	—	0/0/1
Anthus spinoletta	Rock Pipit	1	—	—	—	—	—	0/0/1
Pycnonotus leucogenys	White-eared Bulbul	1	—	—	—	—	—	0/0/1
Pycnonotus cafer bengalensis	Red-vented Bulbul	2	—	—	—	—	—	0/0/2
Chloropsis aurifrons	Golden-fronted Leafbird	2	1	—	—	—	—	1/1/1
Irena puella	Fairy Bluebird	3	—	—	—	1	—	1/1
Lanius vittatus	Bay-backed Shrike	1	—	—	—	—	—	0/0/1
Bombycilla cedrorum	Cedar Waxwing	2	—	—	—	—	—	0/0/2
Copsychus malabaricus	Shama	1	—	—	—	—	—	1/0
Turdus olivaceus pelios	African Thrush	2	—	—	—	—	—	0/0/2
Turdus merula	Blackbird	1	—	—	—	1	—	—
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Turdus pilaris	Fieldfare	—	1	—	—	—	—	0/0/1
Turdoides striatus	Jungle Babbler	1	—	—	—	—	—	0/0/1
Garrulax albogularis	White-throated Jay Thrush	4	—	—	—	—	—	0/0/4
Garrulax leucolophus	White-crested Laughing Thrush	4	—	—	—	—	—	0/0/4
Garrulax pectoralis	Necklace Jay Thrush	1	1	—	—	—	—	0/0/2
Garrulax cineraceus	Grey-headed Babbler	1	—	—	—	—	—	0/0/1
Garrulax poecilorhynchus	Rufous Laughing Thrush	2	—	—	—	—	—	0/0/2
Leiothrix argentauris	Silver-eared Mesia	1	—	—	—	—	—	0/0/1
Leiothrix lutea	Pekin Robin	4	1	—	—	1	—	2/2
Malurus cyaneus	Superb Blue Wren	3	—	—	—	1	—	1/1
Malurus splendens	Splendid Fairy Wren	3	—	—	—	—	—	2/1
Zosterops japonica	Japanese White-eye	3	1	—	—	—	4	—
Zosterops everetti	Everett's White-eye	9	—	—	—	5	4	—
Zosterops senegalensis	Yellow White-eye	1	—	—	—	1	—	—
Meliphaga penicillata	White-plumed Honeyeater	2	—	—	—	—	—	0/0/2
Emberiza bruniceps	Red-headed Bunting	1	—	—	—	—	—	0/0/1
Sporophila minuta	Ruddy-breasted Seedeater	2	—	—	—	—	—	1/1
Gubernatrix cristata	Green Cardinal	2	—	—	—	—	—	1/1
Paroaria coronata	Red-crested Cardinal	2	—	—	—	—	—	0/0/2
Passerina caerulea	Blue Grosbeak	1	—	—	—	—	—	0/0/1
Passerina leclancherii	Rainbow Bunting	1	—	—	—	—	—	0/1
Tachyphonus rufus	Black Tanager	2	—	—	—	—	—	1/1
Ramphocelus nigrogularis	Masked Crimson Tanager	1	—	—	—	—	—	1/0
Ramphocelus flammigerus icteronotus	Lemon-rumped Tanager	2	—	—	—	—	—	1/1
Thraupis episcopus	Blue-Grey Tanager	4	—	—	—	1	1	0/0/2
Tangara schrankii	Green and Gold Tanager	—	2	—	—	—	—	1/1
Tangara cyanicollis	Blue-necked Tanager	—	2	—	—	—	2	—
Cyanerpes caeruleus	Purple Honeycreeper	—	2	—	—	—	—	1/1
Cyanerpes cyaneus	Red-legged Honeycreeper	—	2	—	—	1	—	0/0/1
Cacicus melanicterus	Mexican Cacique	—	2	—	—	—	—	1/1
Molothrus bonariensis	Shiny Cowbird	4	—	—	—	—	—	4/0
Fringilla coelebes	Chaffinch	1	—	—	—	—	—	1/0
Serinus leucopygius	Grey Singing Finch	1	—	—	—	—	—	1/0
Serinus atrogularis	Yellow-rumped Serin	1	—	—	—	—	—	0/0/1
Serinus mozambicus	Green Singing Finch	1	—	—	—	—	—	1/0
Carduelis chloris	Greenfinch	12	—	—	—	1	—	0/1/10
Carduelis carduelis	Goldfinch	2	—	—	—	—	—	0/0/2
Acanthis flammea	Redpoll	2	—	—	—	—	—	1/1
Pyrrhula pyrrhula	Bullfinch	1	—	—	—	—	—	1/0
Mandingoa nitidula schlegeli	Schlegel's Twinspot	1	—	—	—	—	—	0/0/1
Spermophaga haematina	Western Bluebill	1	—	—	—	—	—	0/0/1
Estrilda melpoda	Orange-cheeked Waxbill	1	2	—	—	2	1	—
Estrilda troglodytes	Common Waxbill	1	—	—	—	—	—	0/0/1
Amandava amandava	Avadavat	2	—	—	—	—	—	2/0
Amandava subflava	Golden-breasted Waxbill	1	—	—	—	1	—	—
Neochima ruficauda	Starfinch	1	—	—	—	—	—	0/0/1
Poephila guttata castanoventris	Zebra Finch	8	2	—	—	2	—	2/3/3
Chloebia gouldiae	Gouldian Finch	1	—	—	—	1	—	—
Lonchura malabarica	Silverbill	2	—	—	—	1	1	—
Lonchura molucca atricapilla	Black-headed Mannikin	2	—	—	—	2	—	—
Lonchura punctulata	Nutmeg Finch	1	—	—	—	1	—	—
Lonchura malacca	Tri-coloured Mannikin	1	—	—	—	1	—	—
Lonchura maja	White-headed Mannikin	4	—	—	—	—	—	0/0/4
Lonchura sp. (domesticated)	Bengalese Finch	2	—	—	—	1	—	0/1
Padda oryzivora	Java Sparrow	2	—	—	—	1	—	0/1
Amadina fasciata	Cut-throat Finch	2	2	—	—	1	—	1/0/2
Petronia petronia	Rock Sparrow	2	—	—	—	—	—	1/1
Ploceus melanogaster stephanophorus	Black-billed Weaver	1	—	—	—	—	—	1/0
Ploceus velatus	Masked Weaver	3	1	—	—	1	—	1/0/2
Ploceus cucullatus	Spotted-backed Weaver	1	—	—	—	—	—	1/0
Quelea erythrops	Red-headed Weaver	1	—	—	—	—	—	0/0/1
Quelea quelea	Red-beaked Weaver	2	—	—	—	—	—	0/0/2
Euplectes progne delamerei	Delamere's Giant Whydah	1	—	—	—	1	—	—
Vidua paradisaea	Paradise Whydah	1	—	—	—	—	—	0/1
Aplonis panayensis strigata	Malayan Glossy Starling	2	—	—	—	—	—	0/0/2
Cinnyricinclus sharpii	Sharpe's Starling	2	—	—	—	1	—	0/0/1
Cinnyricinclus leucogaster	Amethyst Starling	1	—	—	—	1	—	—
Spreo superbus	Superb Glossy Starling	6	—	—	—	—	—	2/1/3
Creatophora cinerea	Wattled Starling	—	29	—	—	1	—	0/0/28
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Sturnus sericeus	Silky Starling	2	—	—	—	—	—	0/0/2
Sturnus vulgaris	Common Starling	—	1	—	—	—	—	1/0
Sturnus cineraceus	Grey Starling	2	—	—	—	—	—	0/0/2
Sturnus sinensis	Chinese Starling	1	—	—	—	—	—	0/0/1
Leucopsar rothschildii	Rothschild's Grackle	4	—	—	—	1	—	1/2
Acridotheres cristatellus cristatellus	Chinese Crested Mynah	1	—	—	—	—	—	0/0/1
Gracula religiosa intermedia	Nepal Hill Mynah	4	3	—	—	1	—	3/1/2
Struthidea cinerea	Grey Struthidea	2	—	—	—	—	—	0/1/1
Garrulus glandarius	Jay	3	—	—	—	—	—	0/0/3
Cyanopica cyana	Azure-winged Magpie	2	—	—	—	2	—	—
Pica pica pica	Magpie	1	—	—	—	—	—	0/0/1
Pyrrhocorax graculus	Alpine Chough	4	—	—	—	—	—	0/1/3
Corvus monedula spermologus	Jackdaw	2	1	—	—	1	—	0/0/2
Corvus frugilegus	Rook	1	—	—	—	—	—	0/0/1
Corvus corone corone	Carrion Crow	3	—	—	—	—	—	0/0/3
Corvus corone cornix	Hooded Crow	2	—	—	—	—	—	0/0/2
Corvus corax corax	Raven	3	—	—	—	—	—	0/0/3
Corvus albicollis	White-necked Raven	2	—	—	—	—	—	0/0/2
	Total–Birds	1144	128 (6)	136	5	165	116 (9)	1122

Reptiles

TESTUDINES

Chelydra serpentina serpentina	Snapper	—	1	—	—	1	—	—
Sternotherus odoratus	Stinkpot	2	—	—	—	—	—	0/0/2
Kinosternon subrubrum	Common Mud Terrapin	1	—	—	—	—	—	0/0/1
Kinosternon scorpioides	Scorpion Mud Terrapin	2	—	—	—	—	—	1/0/1
Platysternon megacephalum	Large-headed Terrapin	—	3	—	—	1	2	—
Chrysemys scripta scripta	Yellow-bellied Terrapin	5	—	—	—	—	—	1/4
Chrysemys scripta elegans	Red-eared Terrapin	14	12	—	—	6	12	4/2/2
Chrysemys floridana floridana	Florida Terrapin	3	—	—	—	—	—	0/2/1
Ocadia sinensis	Bennett's Terrapin	1	—	—	—	—	—	1/0
Chinemys reevesii	Reeves's Terrapin	1	—	—	—	—	—	0/1
Siebenrockiella crassicollis	Thick-necked Terrapin	1	—	—	—	—	—	0/1
Mauremys caspica rivulata	Western Caspian Terrapin	1	—	—	—	1	—	—
Mauremys caspica leprosa	Spanish Terrapin	6	—	—	—	—	—	0/0/6
Clemmys insculpta	Wood Terrapin	2	—	—	—	—	—	1/1
Emys orbicularis	European Pond Terrapin	8	4	—	—	—	—	1/0/11
Terrapene carolina	Carolina Box Terrapin	—	1	—	—	—	—	0/1
Terrapene carolina triunguis	Three-toed Box Terrapin	2	—	—	—	—	—	1/1
Terrapene carolina major	Gulf Coast Box Terrapin	2	—	—	—	2	—	—
Melanochelys trijuga trijuga	Hard-shelled Terrapin	3	—	—	—	—	—	1/1/1
Melanochelys trijuga thermalis	Ceylon Black Terrapin	1	—	—	—	—	—	0/1
Hoesemys grandis	Burmese Terrapin	2	—	—	—	1	—	1/0
Cyclemys dentata	Oldham's Terrapin	1	—	—	—	—	—	0/0/1
Cuora trifasciata	Three-banded Box Terrapin	1	—	—	—	—	—	1/0
Cuora amboinensis	Malayan Box Terrapin	3	—	—	—	1	—	1/1
Testudo graeca	Mediterranean Spur-thighed Tortoise	3	2	—	—	2	2	0/0/1
Testudo hermanni	Hermann's Tortoise	2	1	—	—	1	1	1/0
Testudo marginata	Marginated Tortoise	—	1	—	—	—	1	—
Testudo kleinmanni	Leith's Tortoise	1	—	—	—	1	—	—
Testudo horsfieldi	Horsfield's Tortoise	2	—	—	—	—	2	—
Geochelone elegans	Starred Tortoise	3	—	—	—	—	—	0/0/3
Malacochersus tornieri	Pancake Tortoise	—	2	—	—	—	—	1/1
Geochelone sulcata	African Spurred Tortoise	2	—	—	—	—	—	1/1
Geochelone gigantea gigantea	Aldabra Giant Tortoise	7	2	—	—	—	—	4/4/1
Geochelone elephantopus elephantopus	South Albemarle Giant Tortoise	2	—	—	—	—	—	1/1
Geochelone elephantopus nigrita	Porter's Blackish Giant Tortoise	2	—	—	—	1	—	1/0
Geochelone denticulata	Jaboty Tortoise	—	1	—	—	—	—	0/0/1
Geochelone carbonaria	Red-footed Tortoise	1	—	—	—	—	—	1/0
Chelonia mydas	Green Turtle	3	—	—	—	1	—	0/0/2
Eretmochelys imbricata	Hawksbill Turtle	1	2	—	—	1	—	0/0/2
Caretta caretta	Loggerhead Turtle	1	18	—	—	12	—	0/0/7
Lepidochelys olivacea	Ridley Turtle	1	—	—	—	—	—	0/0/1
Pelusios niger	Black Terrapin	1	—	—	—	—	—	0/0/1
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Pelusios sinuatus	Serrated Terrapin	2	—	—	—	—	—	0/2
Pelusios subniger	African Mud Terrapin	6	—	—	—	—	1	2/2/1
Podocnemis expansa	Arrau Turtle	2	—	—	—	—	—	1/1
Chelus fimbriatus	Matamata	1	4	—	—	1	—	2/2
Trionyx hurum	Soft-shelled Turtle	8	—	—	—	—	3	0/0/5
Trionyx cartilagineus	Phayre's Soft-shelled Turtle	1	—	—	—	1	—	—
Trionyx spiniferus spiniferus	Spiny Soft-shelled Turtle	1	—	—	—	—	—	1/0
CROCODYLIA								
Crocodylus porosus	Estuarine Crocodile	1	—	—	—	—	1	—
Crocodylus palustris	Mugger	2	—	—	—	—	2	—
Crocodylus moreletii	Morelet's Crocodile	1	—	—	—	—	1	—
Osteolaemus tetraspis tetraspis	West African Dwarf Crocodile	—	1	—	—	—	—	0/0/1
Alligator mississippiensis	American Alligator	3	—	—	—	—	—	1/2
Alligator sinensis	Chinese Alligator	—	3	—	—	—	—	1/2
Caiman crocodilus	Spectacled Cayman	—	2	—	—	—	2	—
Caiman crocodilus yacare	Jacaré Cayman	5	—	—	—	—	2	2/1
SAURIA								
Hemitheconyx caudicinctus	African Fat-tailed Gecko	1	—	—	—	—	—	1/0
Hemidactylus frenatus	Bridled House Gecko	—	1	—	—	1	—	—
Gekko gecko	Tokay Gecko	2	1	—	—	2	—	1/0
Eublepharis macularius	Leopard Ground Gecko	16	6	1	—	1	—	3/4/15
Gekko sp.	Gecko	—	1	—	—	1	—	—
Anolis equestris	Knight Anole	1	—	—	—	—	—	1/0
Anolis carolinensis	Green Anole	1	—	—	—	—	—	1/0
Anolis sp.		11	—	—	—	—	—	0/0/11
Corythophanes cristatus	Helmeted Iguanid	5	—	—	—	4	—	1/0
Laemanctus longipes deborrei	Casque-headed Lizard	2	2	—	—	—	—	1/1/2
Cyclura cornuta	Rhinoceros Iguana	1	—	—	—	—	—	1/0
Leiocephalus schreibersii	Curly-tailed Lizard	—	4	—	—	—	—	2/2
Iguana iguana	Common Iguana	4	5	—	—	5	—	0/0/4
Dipsosaurus dorsalis	Desert Iguana	6	—	—	—	2	—	2/2
Sauromalus obesus	Chuckwalla Lizard	3	2	—	—	—	—	2/3
Gambelia wislizenii	Leopard Lizard	—	1	—	—	—	—	0/0/1
Callisaurus draconoides	Zebra-tailed Lizard	1	—	—	—	1	—	—
Sceloporus sp.		—	7	—	2	5	—	—
Sceloporus poinsetti	Crevice Spiny Lizard	2	—	—	—	—	1	0/0/1
Sceloporus orcutti	Granite Spiny Lizard	2	—	—	—	2	—	—
Calotes sp.	Tree Lizard	1	—	—	—	1	—	—
Physignathus cocincinus	Cochin China Water Dragon	4	2	—	—	—	—	1/3/2
Uromastyx acanthinurus	Bell's Dabb Lizard	1	—	—	—	—	—	1/0
Chamaeleo dilepis	Flap-necked Chameleon	—	1	—	—	—	—	0/0/1
Chamaeleo jacksoni	Jackson's Chameleon	1	4	3	3	4	—	1/0
Egernia cunninghami	Cunningham's Skink	1	—	—	—	—	—	0/1
Trachydosaurus rugosus	Shingle-back	2	—	—	—	—	—	0/0/2
Tiliqua gigas	Giant New Guinea Skink	2	—	—	—	—	—	1/1
Tiliqua scincoides	Eastern Blue-tongued Skink	1	4	—	—	3	—	0/0/2
Mabuya brevicollis	Short-necked Skink	—	1	8	4	2	—	1/0/2
Mabuya quinquetaeniata	Five-lined Skink	1	3	—	—	1	—	1/2
Riopa sp.	Writhing Skink	—	1	—	—	1	—	—
Eumeces algeriensis	Algerian Skink	1	—	—	—	1	—	—
Chalcides ocellatus	Ocellated Skink	1	1	—	—	—	—	0/0/2
Gerrhosaurus validus	Plated Rock Lizard	7	—	—	—	6	1	—
Gerrhosaurus major	Tawny Plated-lizard	—	6	—	—	1	—	0/0/5
Lacerta viridis	Green Lizard	10	—	—	—	9	—	0/0/1
Lacerta lepida	Ocellated Lizard	11	—	—	—	11	—	—
Gallotia simonyi stehlini	Stehlin's Lizard	—	2	—	—	—	—	1/1
Podarcis lilfordi	Lilford's Wall Lizard	—	6	—	—	—	—	0/0/6
Acanthodactylus erythrurus	Spiny-footed Lizard	3	—	—	—	1	—	0/0/2
Psammodromus algirus	Algerian Sand Lizard	3	—	—	—	2	—	0/0/1
Tupinambis nigropunctatus	Black-pointed Tegu	2	4	—	—	—	2	2/2
Ameiva sp.		2	—	—	—	—	2	—
Varanus exanthematicus	Bosc's Monitor	1	1	—	—	—	1	1/0
Varanus salvator	Two-banded Monitor	—	1	—	—	—	1	—
Varanus niloticus	Nile Monitor	—	1	—	—	—	1	—
Heloderma suspectum	Gila Monster	3	—	—	—	1	—	1/1
Heloderma horridum	Mexican Beaded Lizard	1	—	—	—	—	—	1/0
Ophisaurus apodus	European Glass Lizard	1	—	—	—	1	—	—
Cordylus giganteus	Sungazer	2	—	—	—	2	—	—
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Cordylus warreni breyeri	Breyer's Girdled Lizard	2	—	—	—	1	—	1/0
Platysaurus guttatus	Rock Lizard	2	—	—	—	1	—	1/0
Platysaurus guttatus minor	Transvaal Rock Lizard	2	—	—	—	—	—	1/1
SERPENTES								
Liasis fuscus	Water Python	—	2	—	—	—	—	1/1
Liasis amethystinus	Amethystine Python	1	—	—	—	—	—	0/1
Morelia spilotes variegata	Carpet Python	1	—	—	—	—	—	1/0
Python reticulatus	Reticulated Python	3	—	—	—	1	—	1/1
Python molurus	Indian Rock Python	6	4	—	—	1	—	1/3/5
Python regius	Royal Python	7	1	—	—	1	3	1/1/2
Eunectes murinus	Anaconda	1	3	—	—	1	1	1/1
Eunectes notaeus	Yellow Anaconda	1	2	—	—	—	—	1/2
Boa constrictor	Boa Constrictor	7	6	20	4	4	9	4/4/8
Eryx conicus	Russell's Sand-boa	1	2	—	—	—	—	0/0/3
Eryx johni	John's Sand-boa	—	1	—	—	1	—	—
Natrix natrix	Grass Snake	1	2	—	—	2	—	0/0/1
Natrix tessellata	Dice Snake	—	1	—	—	1	—	—
Thamnophis sp.	Garter Snake	—	2	—	—	2	—	—
Thamnophis sirtalis	Common Garter Snake	5	4	—	—	—	5	0/0/4
Thamnophis sirtalis similis	Blue-striped Garter Snake	2	—	—	—	2	—	—
Thamnophis sirtalis parietalis	Red-sided Garter Snake	1	1	—	—	1	—	0/0/1
Thamnophis radix	Great Plains Garter Snake	2	—	—	—	—	—	0/0/2
Boaedon fuliginosus	African House Snake	9	2	8	—	10	1	2/2/4
Elaphe guttata	Corn Snake	2	2	—	—	2	—	1/1
Elaphe obsoleta quadrivittata	Yellow Rat Snake	1	2	—	—	2	—	1/0
Elaphe radiata	Copperhead Racer	3	—	—	—	2	1	—
Elaphe scalaris	Ladder Snake	9	1	—	—	1	3	1/1/4
Coluber jugularis	Large Whip-Snake	—	1	—	—	—	—	0/0/1
Coluber gemonensis	Balkan Whip-Snake	1	5	—	—	1	—	2/2/1
Coluber najadum	Dahl's Whip-Snake	1	—	—	—	—	—	0/0/1
Coluber ravergieri ravergieri	Ravergier's Whip-Snake	1	—	—	—	1	—	—
Pituophis melanoleucus	Pine Snake	1	—	—	—	1	—	—
Alsophis vudi	Bahaman Brown Snake	—	1	—	—	—	—	0/0/1
Hydrodynastes gigas	Boipevaçu Snake	1	2	—	—	1	—	1/1
Rhinocheilus lecontei	Long-nosed Snake	1	—	—	—	—	—	0/0/1
Lampropeltis getulus holbrooki	Speckled King Snake	2	1	—	—	1	—	1/1
Lampropeltis getulus californiae	Californian King Snake	2	2	—	—	2	—	1/1
Malpolon monspessulanus	Montpellier Snake	5	—	—	—	2	—	0/3
Dispholidus typus	Boomslang	—	3	—	—	—	—	1/2
Hydrophis sp.	Sea Snake	—	5	—	—	4	—	0/0/1
Walterinnesia aegyptia	Innes' Cobra	3	—	—	—	3	—	—
Naja haje	Egyptian Cobra	2	—	—	—	1	—	1/0
Naja nivea	Cape Cobra	1	—	—	—	1	—	—
Naja melanoleuca	Black and White Cobra	1	2	—	—	—	—	2/1
Naja nigricollis	Black-necked Cobra	1	—	—	—	—	—	0/1
Naja naja	Indian Cobra	2	—	—	—	—	—	1/1
Dendroaspis angusticeps	Common Green Mamba	1	—	—	—	—	—	0/1
Dendroaspis polylepis	Black Mamba	2	—	8	—	4	—	1/1/4
Causus rhombeatus	Rhombic Night Adder	—	1	—	—	—	—	0/0/1
Vipera xanthina palaestinae	Palestine Viper	4	—	—	—	—	—	2/2
Vipera ammodytes meridionalis	Long-nosed Viper	4	—	—	—	—	—	2/2
Vipera lebetina schweizeri	Cyclades Blunt-nosed Viper	1	—	—	—	—	—	1/0
Bitis arietans	Puff Adder	4	—	—	—	3	—	0/1
Bitis gabonica	Gaboon Viper	1	1	—	—	—	—	1/1
Echis carinatus	Carpet Viper	1	—	—	—	—	—	1/0
Agkistrodon piscivorus	Cottonmouth	2	—	—	—	2	—	—
Agkistrodon contortrix mokeson	Northern Copperhead	3	—	—	—	1	—	1/1
Hypnale hypnale	Merrem's Hump-nosed Viper	1	—	—	—	1	—	—
Trimeresurus popeorum	Pope's Pit Viper	8	—	—	—	2	—	1/1/4
Bothrops lanceolatus	Martinique Fer-de-lance	1	—	—	—	—	—	1/0
Sistrurus miliarius	Pygmy Rattlesnake	4	—	—	—	1	—	2/1
Crotalus atrox	Western Diamond-back Rattlesnake	3	—	4	—	—	—	1/2/4
Total–Reptiles		381	190	52	13	173	64	373

1 2 3 4 5 6 7

Amphibians

		1	2	3	4	5	6	7
URODELA								
Siren lacertina	Greater Siren	1	—	—	—	1	—	—
Necturus maculosus	Mud-puppy	1	—	—	—	—	—	0/0/1
Amphiuma means	Amphiuma	—	1	—	—	—	—	0/0/1
Andrias japonicus	Giant Salamander	1	—	—	—	—	—	0/0/1
Triturus cristatus	Crested Newt	32	—	14	—	3	—	0/0/43
Triturus vulgaris	Common Smooth Newt	11	—	—	—	3	—	0/0/8
Triturus helveticus	Palmate Newt	—	6	—	—	—	—	0/0/6
Cynops pyrrhogaster	Japanese Newt	—	6	—	—	—	—	0/0/6
Taricha granulosa	Rough-skinned Newt	—	4	—	—	4	—	—
Euproctus asper	Pyrenean Brook Salamander	5	—	—	—	5	—	—
Pleurodeles waltl	Sharp-ribbed Salamander	2	—	—	—	2	—	—
Salamandra salamandra	Fire Salamander	4	6	—	—	4	—	0/0/6
Ambystoma tigrinum	Tiger Salamander	4	—	—	—	2	—	0/0/2
Ambystoma maculatum	American Spotted Salamander	—	4	—	—	1	—	0/0/3
Ambystoma opacum	Marbled Salamander	5	—	—	—	3	—	0/0/2
Ambystoma mexicanum	Axolotl	2	16	—	—	5	—	0/0/13
ANURA								
Xenopus laevis	Clawed Frog	6	6	—	—	11	—	0/0/1
Xenopus muelleri	Muller's Clawed Frog	2	4	—	—	6	—	—
Pipa pipa	Surinam Toad	2	3	—	—	1	—	0/0/4
Bombina variegata	Yellow-bellied Toad	5	2	—	—	—	—	0/0/7
Alytes obstetricans	Midwife Toad	4	—	—	—	4	—	—
Megophrys nasuta	Malayan Horned Frog	—	4	—	—	2	—	0/0/2
Bufo calamita	Natterjack	9	—	—	—	9	—	—
Bufo regularis	Common African Toad	—	4	—	—	2	—	0/0/2
Bufo bufo	Common European Toad	64	—	—	—	64	—	—
Bufo americanus	American Toad	4	10	—	—	11	—	0/0/3
Bufo woodhousei fowleri	Fowler's Toad	6	—	—	—	—	—	0/0/6
Bufo marinus	Giant Toad	6	—	—	—	—	—	0/0/6
Hyla arborea	European Tree Frog	2	—	—	—	2	—	—
Hyla cinerea	Green Tree Frog	—	10	—	—	5	—	0/0/5
Hyla chrysoscelis	Southern Gray Tree Frog	—	4	—	—	4	—	—
Hyla versicolor	Common Grey Tree Frog	6	—	—	—	6	—	—
Hyla rubra rubra	Daudin's Tree Frog	1	—	—	—	1	—	—
Hyla caerulea	White's Hyla	—	4	—	—	—	—	0/0/4
Hyla septentrionalis	Cuban Tree Frog	4	—	—	—	1	—	0/0/3
Pseudis paradoxa	South American Paradox Frog	—	4	—	—	—	—	0/0/4
Rana esculenta	Edible Frog	20	—	—	—	14	—	0/0/6
Rana ridibunda	Marsh Frog	19	—	—	—	10	—	0/0/9
Rana temporaria	Common Frog	14	—	22	—	—	—	0/0/36
Rana galamensis	Galam Lake Frog	4	—	—	—	4	—	—
Pyxicephalus adspersus	African Bull Frog	1	—	—	—	1	—	—
Rana catesbeiana	American Bull Frog	4	—	—	—	1	—	0/0/3
Rana pipiens	Leopard Frog	2	—	—	—	1	—	0/0/1
Rana erythraea	Gold-lined Frog	8	—	—	—	5	—	0/0/3
Hyperolius sp.		—	6	—	—	6	—	—
Hyperolius marmoratus	African Reed Frog	—	5	—	—	1	—	0/0/4
Kasina senegalensis	Senegalese Striped Frog	6	—	—	—	—	—	0/0/6
Kaloula pulchra	Malayan Bull Frog	1	—	—	—	1	—	—
Breviceps adspersus	Rain Frog	—	1	—	—	1	—	—
Phrynomerus bifasciatus	Orange-banded Wood Toad	—	2	—	—	1	—	0/0/1
	Total–Amphibians	268	112	36	—	208	—	208

WHIPSNADE PARK

Mammals

MARSUPIALIA								
Macropus rufogriseus	Red-necked Wallaby	249	—	127	—	99	14	10/5/248*
Megaleia rufa	Red Kangaroo	1	—	—	—	1	—	—
PRIMATES								
Saimiri sciureus	Squirrel Monkey (Black-capped form)	—	16	4	2	—	—	1/15/2
Erythrocebus patas	Patas Monkey	1	—	—	—	1	—	—
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Pan troglodytes	Chimpanzee	6	1 (1)	1	1	—	1 (1)	1/5
RODENTIA								
Cynomys ludovicianus	Prairie Marmot	53	—	—	—	2	20	0/0/31
Dolichotis patagonum	Mara	14	—	5	—	5	1	3/1/9
Dasyprocta punctata	Central American Agouti	3	—	—	—	1	2	—
CETACEA								
Tursiops truncatus	Bottle-nosed Dolphin	4	—	—	—	1	—	1/2
CARNIVORA								
Canis lupus	Grey Wolf	20	—	4	2	3	—	2/2/15
Lycaon pictus	Cape Hunting Dog	5	—	—	—	—	2 (2)	1/2
Tremarctos ornatus	Spectacled Bear	2	—	—	—	—	—	1/1
Ursus arctos	Brown Bear	4	—	—	—	—	1	1/2
Ursus arctos	Brown Bear (Kodiak form)	2	—	3	—	—	3	1/1
Thalarctos maritimus	Polar Bear	3	—	—	—	—	1	1/1
Ailurus fulgens	Red Panda	2	—	—	—	—	—	1/1
Nasua nasua	Ring-tailed Coati	4	—	3	—	1	—	2/4
Suricata suricatta	Suricate Meerkat	2	—	—	—	—	—	0/2
Felis lynx	Northern Lynx	3	1	—	—	—	—	1/3
Felis serval	Serval	2	1	1	—	2	—	1/1
Panthera leo	Lion	7	—	—	—	—	1	1/5
Panthera tigris	Tiger	2	—	—	—	—	2	—
Panthera tigris	Tiger (Sumatran form)	2	—	—	—	—	2 (2)	—
Panthera tigris	Tiger (Siberian form)	—	2 (2)	—	—	—	—	0/2
Panthera onca	Jaguar	2	—	2	—	—	1 (1)	0/3
Acinonyx jubatus	Cheetah	16	—	14	3	2	3	8/14
PINNIPEDIA								
Otaria byronia	Southern Sealion	2	—	—	—	—	—	1/1
Phoca vitulina	Common Seal	—	3	—	—	1	1	0/0/1
PROBOSCIDEA								
Elephas maximus	Indian Elephant	1	—	—	—	—	—	0/1
Loxodonta africana	African Elephant	3	—	—	—	—	—	1/2
PERISSODACTYLA								
Equus przewalskii	Przewalski's Horse	14	—	5	2	—	4	2/11
Asinus hemionus	Onager (Persian form)	6	—	2	—	2	—	3/3
Hippotigris zebra	Mountain Zebra	4	—	—	—	—	1	1/2
Hippotigris burchelli	Common Zebra	7	—	2	—	1	—	2/6
Rhinoceros unicornis	Indian Rhinoceros	2	—	—	—	—	—	1/1
Diceros bicornis	Black Rhinoceros	2	—	1	—	—	—	1/2
Ceratotherium simum	White Rhinoceros	15	—	3	—	—	—	5/13
ARTIODACTYLA								
Sus scrofa	Wild Boar	2	—	—	—	—	—	1/1
Tayassu tajacu	Collared Peccary	12	—	2	—	1	—	6/5/2
Hippopotamus amphibius	Hippopotamus	4	—	1	—	—	1	2/2
Choeropsis liberiensis	Pygmy Hippopotamus	5	—	1	—	—	—	1/4/1
Lama glama	Llama	33	1	—	—	2	19	4/9
Lama guanicoe	Guanaco	18	—	6	—	1	6	4/13
Camelus bactrianus	Bactrian Camel	18	—	5	—	3	—	8/12
Camelus dromedarius	Arabian Camel	8	1	—	—	2	—	0/7
Muntiacus reevesi	Reeves's Muntjac	11	2 (2)	30	—	1	4	15/23
Dama dama	Fallow Deer	58	—	18	2	3	18	13/17/23
Axis axis	Axis Deer	31	—	11	—	4	—	15/14/9
Axis porcinus	Hog Deer	29	—	9	4	5	2	11/12/4
Cervus duvauceli	Barasingha	17	—	4	1	2	4	5/7/2
Cervus nippon	Sika Deer (Ryukyu × Japanese form)	6	—	3	2	—	—	4/2/1
Cervus nippon	Sika Deer (Formosan form)	34	—	9	3	2	4	5/10/19
Cervus elaphus	Red Deer	48	—	—	—	5	43	—
Elaphurus davidianus	Père David's Deer	46	—	14	—	7	2	23/24/4
Alces alces	Moose	5	—	2	1	1	—	2/3
Rangifer tarandus	Reindeer	11	—	2	—	2	3	2/6
Hydropotes inermis	Chinese Water Deer	60	—	35	—	3	11	0/0/81
Giraffa camelopardalis	Giraffe	2	—	—	—	—	—	1/1
Tragelaphus spekei	Sitatunga	12	1	4	—	8	—	2/7
Boselaphus tragocamelus	Nilgai	9	—	7	—	1	—	6/9
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Bos grunniens	Yak	8	2 (2)	1	—	—	—	5/6
Syncerus caffer	Cape Buffalo	4	—	—	—	—	—	3/1
Bison bonasus	European Bison	12	—	6	—	—	—	6/12
Bison bison	American Bison	13	—	4	—	—	2	5/9/1
Kobus ellipsiprymnus	Common Waterbuck	—	7	—	—	—	—	7/0
Hippotragus equinus	Roan Antelope	—	2	—	—	—	—	2/0
Oryx tao	Scimitar-horned Oryx	5	6 (2)	—	—	3	2 (2)	6/0
Damaliscus dorcas	Blesbok	6	—	1	—	1	—	1/5
Connochaetes taurinus	Brindled Gnu	6	—	1	—	3	—	1/2/1
Antilope cervicapra	Blackbuck	13	3 (3)	—	—	2	—	14/0
Gazella thomsoni	Thomson's Gazelle	23	—	6	2	8	—	8/8/3
Ovibos moschatus	Musk Ox	4	—	3	—	—	—	3/4
Ovis musimon	Mouflon	31	—	17	8	4	—	13/14/9
DOMESTIC								
	Ponies	15	1	—	—	—	2	9/5
	Pygmy Donkey	2	—	—	—	—	—	1/1
	Vietnamese Pot-bellied Pig	3	—	—	—	1	—	1/1
	Windsor White Goat	23	—	12	—	8	3	10/14
	Total–Mammals	1112	50 (12)	391	33	205	186 (8)	1129
Birds								
STRUTHIONIFORMES								
Struthio camelus	Ostrich	5	—	—	—	—	—	1/1/3
RHEIFORMES								
Rhea americana	Common Rhea	9	—	11	2	6	—	4/2/6
CASUARIIFORMES								
Casuarius casuarius	Australian Cassowary	3	—	1	—	—	—	1/1/2
Dromaius novaehollandiae	Emu	13	—	—	—	1	3	3/4/2
SPHENISCIFORMES								
Aptenodytes patagonica	King Penguin	11	—	1	—	—	—	1/2/9
Eudyptes crestatus	Rockhopper Penguin	6	—	1	1	—	—	1/1/4
Spheniscus humboldti	Humboldt's Penguin	45	—	20	14	3	6	10/10/22
PELECANIFORMES								
Morus bassanus	Gannet	—	1	—	—	—	1 (1)	—
CICONIIFORMES								
Ciconia ciconia	White Stork	2	—	—	—	—	—	0/0/2
Threskiornis aethiopicus	Sacred Ibis	4	—	—	—	2	2 (1)	—
Phoenicopterus ruber roseus	Greater Flamingo	7	—	—	—	—	—	0/0/7
Phoenicopterus ruber ruber	Rosy Flamingo	64	—	9	1	4	—	17/17/34
Phoenicopterus chilensis	Chilean Flamingo	57	—	11	—	2	6	12/12/36
ANSERIFORMES								
Dendrocygna bicolor	Fulvous Whistling Duck	2	—	—	—	1	—	1/0
Cygnus atratus	Black Swan	14	—	—	—	—	—	4/4/6
Cygnus melanocoryphus	Black-necked Swan	2	—	—	—	1	—	1/0
Cygnus cygnus	Whooper Swan	2	—	—	—	—	—	1/1
Coscoroba coscoroba	Coscoroba Swan	4	2	—	—	1	—	3/2
Anser cygnoides	Chinese Goose	1	—	—	—	—	—	1/0
Anser anser	Greylag Goose	17	—	—	—	1	2	6/6/2
Anser indicus	Bar-headed Goose	24	—	11	—	—	—	6/6/23
Anser caerulescens caerulescens	Lesser Snow Goose	17	—	—	—	2	8	2/2/3
Anser caerulescens atlanticus	Greater Snow Goose	24	—	—	—	2	6	4/4/8
Anser canagicus	Emperor Goose	13	—	2	—	—	1	4/5/5
Branta sandvicensis	Hawaiian Goose	9	—	3	1	2	5	1/1/2
Branta canadensis	Canada Goose	14	1	3	—	1	—	6/7/4
Branta leucopsis	Barnacle Goose	23	—	—	—	—	11	3/3/6
Branta ruficollis	Red-breasted Goose	46	—	—	—	6	11	14/14/1
Cereopsis novaehollandiae	Cape Barren Goose	15	4 (2)	2	1	1	3 (2)	11/5
Alopochen aegyptiacus	Egyptian Goose	5	2	—	—	—	2	1/2/2
Tadorna cana	South African Shelduck	7	2	—	—	—	—	4/3/2
Tadorna variegata	New Zealand Shelduck	2	—	—	—	—	—	1/1
Tadorna tadorna	Shelduck	5	—	—	—	—	—	3/2
Plectropterus gambensis	Spur-winged Goose	1	—	—	—	—	1	—
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Aix sponsa	Carolina Duck	12	—	4	—	1	2	10/3
Aix galericulata	Mandarin Duck	16	—	2	—	2	2	9/5
Chenonetta jubata	Maned Goose	7	—	—	—	2	1	1/1/2
Anas penelope	Wigeon	7	—	—	—	—	2	1/2/2
Anas sibilatrix	Chiloe Wigeon	17	—	9	—	1	1	3/3/18
Anas falcata	Falcated Teal	7	2	—	—	1	2	3/3
Anas strepera	Gadwall	3	—	—	—	—	—	1/2
Anas formosa	Baikal Teal	6	—	—	—	—	1	1/1/3
Anas crecca	Teal	2	—	—	—	2	—	—
Anas superciliosa	New Zealand Grey Duck	3	—	—	—	1	1	1/0
Anas specularioides	Crested Duck	26	—	6	—	1	10	2/3/16
Anas acuta	Pintail	4	—	—	—	—	—	2/2
Anas bahamensis	Bahama Pintail	2	—	—	—	—	—	1/1
Anas querquedula	Garganey	2	—	—	—	—	—	1/1
Anas clypeata	Shoveler	5	—	—	—	—	—	2/3
Netta rufina	Red-crested Pochard	5	—	—	—	—	1	2/2
Aythya ferina	Pochard	7	—	—	—	—	—	4/3
Aythya fuligula	Tufted Duck	3	—	—	—	1	—	2/0
Aythya marila	Scaup	3	2	—	—	—	2	1/2
Somateria mollissima	Eider Duck	9	—	—	—	—	—	4/5
Bucephala islandica	Barrow's Goldeneye	4	—	—	—	—	—	2/2
FALCONIFORMES								
Gyps africanus	African White-backed Vulture	2	—	—	—	1	—	1/0
Gyps rueppellii	Ruppell's Griffon Vulture	1	—	—	—	—	—	0/0/1
Gyps fulvus	Griffon Vulture	2	—	—	—	—	—	0/0/2
Torgos tracheliotus	Lappet-faced Vulture	3	—	—	—	—	—	0/0/3
Sagittarius serpentarius	Secretary Bird	6	—	—	—	2	—	2/0/2
GALLIFORMES								
Meleagris gallopavo	North American Turkey	35	—	—	—	—	8	0/0/27
Francolinus erckelii	Erckel's Francolin	1	—	—	—	—	—	1/0
Lophophorus impeyanus	Impeyan Pheasant	9	—	14	3	4	2	3/2/9
Gallus sonneratii	Sonnerat's Jungle Fowl	6	12 (6)	—	—	2	4	6/6
Lophura nycthemera	Silver Pheasant	12	—	—	—	—	7	2/3
Lophura imperialis	Imperial Pheasant	2	—	—	—	—	—	1/1
Crossoptilon mantchuricum	Brown Eared Pheasant	3	1	1	—	—	—	2/2/1
Catreus wallichi	Cheer Pheasant	9	—	—	—	1	3	1/1/3
Syrmaticus mikado	Mikado Pheasant	1	—	—	—	—	—	1/0
Syrmaticus soemmerringi scintillans	Scintillating Copper Pheasant	2	—	—	—	—	1	0/1
Syrmaticus reevesi	Reeves's Pheasant	3	—	—	—	1	—	1/1
Phasianus colchicus	Common Pheasant	2	—	—	—	—	2	—
Chrysolophus pictus	Golden Pheasant	6	—	3	—	—	2	5/1/1
Chrysolophus amherstiae	Lady Amherst's Pheasant	4	—	—	—	—	—	2/2
Pavo cristatus	Common Peafowl	48	—	25	—	1	5	0/0/67
Numida meleagris	Helmeted Guineafowl	23	—	—	—	—	—	0/0/23
GRUIFORMES								
Grus grus	Common Crane	3	—	—	—	—	—	0/0/3
Grus grus lilfordi	Lilford's Crane	1	—	—	—	—	—	0/0/1
Grus monacha	Hooded Crane	2	—	—	—	1	—	1/0
Grus canadensis	Sandhill Crane	1	—	—	—	—	—	0/1
Grus japonensis	Manchurian Crane	6	—	—	—	—	1 (1)	2/2/1
Grus vipio	White-naped Crane	4	—	—	—	—	—	2/2
Grus antigone	Sarus Crane	4	—	—	—	1	—	1/2
Grus rubicunda	Brolga	2	—	—	—	—	—	1/1
Bugeranus carunculatus	Wattled Crane	4	—	—	—	—	—	2/2
Anthropoides virgo	Demoiselle Crane	9	—	—	—	2	—	1/1/5
Anthropoides paradisea	Stanley Crane	3	1	—	—	—	—	2/2
Balearica pavonina	West African Crowned Crane	7	—	—	—	1	—	0/0/6
Balearica regulorum	South African Crowned Crane	14	1 (1)	—	—	—	—	1/1/13
Choriotis kori	Kori Bustard	6	—	—	—	1	—	1/1/3
COLUMBIFORMES								
Streptopelia 'risoria'	Java Dove (White var.)	6	—	—	—	1	5	—
Geotrygon versicolor	Mountain Witch Dove	1	—	—	—	—	1	—
Goura victoria	Victoria Crowned Pigeon	2	—	—	—	—	—	1/1
PSITTACIFORMES								
Trichoglossus haematodus	Swainson's Lorikeet	4	—	—	—	—	—	0/0/4
Eolophus roseicapillus	Roseate Cockatoo	4	—	—	—	—	—	0/0/4
		1	**2**	**3**	**4**	**5**	**6**	**7**

		1	2	3	4	5	6	7
Cacatua leadbeateri	Leadbeater's Cockatoo	2	—	—	—	—	—	2/0
Cacatua sulphurea	Lesser Sulphur-crested Cockatoo	2	—	—	—	1	—	0/1
Cacatua galerita	Greater Sulphur-crested Cockatoo	3	—	—	—	—	—	0/0/3
Cacatua moluccensis	Moluccan Cockatoo	2	—	—	—	—	—	1/1
Cacatua sanguinea	Bare-eyed Cockatoo	4	—	2	—	1	—	1/1/3
Nymphicus hollandicus	Cockatiel	9	—	—	—	—	—	0/2/7
Alisterus scapularis	King Parrot	—	2	—	—	—	—	1/1
Platycercus eximius cecilae	Golden-mantled Rosella	2	—	—	—	—	—	0/0/2
Platycercus eximius	Eastern Rosella Parrakeet	1	—	—	—	—	—	0/0/1
Psephotus haematonotus	Red-rumped Parrakeet	11	—	8	2	2	4	3/1/7
Psittacus erithacus	Grey Parrot	3	—	—	—	1	—	0/0/2
Psittacula eupatria nipalensis	Alexandrine Parrakeet	1	2	—	—	1	—	1/0/1
Psittacula krameri manillensis	Indian Ring-necked Parrakeet	10	—	—	—	1	—	2/1/6
Ara ararauna	Blue and Yellow Macaw	2	—	—	—	—	—	1/0/1
Ara macao	Scarlet Macaw	3	—	1	—	—	—	1/1/2
Ara chloroptera	Green-winged Macaw	6	—	1	—	—	—	2/2/3
Amazona aestiva	Blue-fronted Amazon Parrot	1	—	—	—	—	—	0/0/1
Amazona ochrocephala	Yellow-fronted Amazon Parrot	1	—	—	—	1	—	—
Amazona amazonica	Orange-winged Amazon Parrot	2	—	—	—	1	—	0/0/1
STRIGIFORMES								
Tyto alba	Barn Owl	1	—	—	—	—	—	0/1
Bubo capensis mackinderi	Kenya Eagle Owl	2	—	—	—	1	—	1/0
Nyctea scandiaca	Snowy Owl	2	—	—	—	1	—	1/0
Strix aluco sylvatica	Tawny Owl	2	—	—	—	—	—	1/1
CORACIIFORMES								
Dacelo novaeguineae	Kookaburra	3	—	1	1	—	1 (1)	1/1
PASSERIFORMES								
Serinus mozambicus	Green Singing Finch	1	—	—	—	—	—	1/0
Uraeginthus bengalus	Cordon Bleu	1	2	—	—	2	—	0/0/1
Estrilda melpoda	Orange-cheeked Waxbill	1	2	—	—	3	—	—
Estrilda troglodytes	Common Waxbill	3	—	—	—	2	—	0/0/1
Estrilda astrild	St. Helena Waxbill	1	2	—	—	1	—	0/0/2
Amandava subflava	Golden-breasted Waxbill	4	2	—	—	2	1	1/2
Gracula religiosa	Hill Mynah	1	—	—	—	—	—	0/0/1
Urocissa erythrorhyncha occipitalis	Red-billed Blue Pie	1	—	—	—	—	—	0/0/1
	Total–Birds	974	43 (9)	152	26	88	140 (6)	915

Reptiles

SAURIA								
Tiliqua gerradii	Pink-tongued Skink	1	—	—	—	—	—	0/0/1
SERPENTES								
Python regius	Royal Python	5	—	—	—	—	—	0/0/5
	Total–Reptiles	6	—	—	—	—	—	6

Summary

		1	2	3	4	5	6	7
Regent's Park	Mammals	990	129 (8)	927	135	351	536 (12)	1024
	Birds	1144	128 (6)	136	5	165	116 (9)	1122
	Reptiles	381	190	52	13	173	64	373
	Amphibians	268	112	36	—	208	—	208
	Total	2783	559 (14)	1151	153	897	716 (21)	2727
	Estimated number of fishes and invertebrates in the Collection at 31 December 1979:							
	Fishes			2896				
	Invertebrates (excluding locusts, ants and bees)			3822				
Whipsnade Park	Mammals	1112	50 (12)	391	33	205	186 (8)	1129
	Birds	974	43 (9)	152	26	88	140 (6)	915
	Reptiles	6	—	—	—	—	—	6
	Total	2092	93 (21)	543	59	293	326 (14)	2050
	Grand Total–Zoological Society of London	4875	652 (35)	1694	212	1190	1042(35)	4777

*Because of the difficulty of counting free ranging animals at Whipsnade at certain times of the year, this total does not include all the Wallabies which died during and as a result of the severe winter and long thaw.

1 2 3 4 5 6 7

List of Donors of Animals to the Society

REGENT'S PARK

Answary, Mrs, 1 Red-eared Terrapin
Appleby, Mr S., 1 Red-eared Terrapin
Avery, Mr A. J., 1 Fieldfare
Aylward, Mrs S., 1 Snapping Turtle
Bankes, Master Angus G. K., 4 Queensland Titan Stick-insect
Berlin Zoo, 1 Indian Leopard
Boorman, Miss, 2 Oscar
Boston, Mr P., 1 Ant Lion, 3 Mantis oothecae
Bowker, Mr D., 1 Goldfish
Brown, Mr G., Stick-insects
Butler, Miss Pierce, 2 Red-eared Terrapin
Calcord, Master Jonathan, 1 Carolina Box Terrapin
Calvert, Miss G., 2 Red-eared Terrapin
Carnel, Mr M., 1 Water Monitor
Carrington, Mr J., 1 Long-finned Batfish, 1 Panther Fish
Christie, Mr & Mrs R., 2 Red-legged Honeycreeper
Cornish, Mr L., Stick-insects
Customs, H.M., 2 Brown Python, 4 Eastern Blue-tongued Skink
Darby, Mr A., 2 Desert Scorpion, 4 Centipede
Drusillas Zoo Park, 1 Cuis
East Dulwich Police Station, 1 Red-sided Garter Snake
Evans, Mr D. J., 2 Cuban Tree Duck
Flindall, Mrs R. L., 1 Quaker Parrakeet
French, Mrs V. E., 1 Zebra Finch
Gatti, Mrs J. E., 1 Red-eared Terrapin
Goddard, Mr L., 1 Leopard Lizard, 1 Bahaman Brown Snake
Harwood, Mr J., 1 Giant Gourami
Head, The Viscountess, 1 Orange-bellied Senegal Parrot
Heath, Mr G., Larvae of Chinese Oak Silk Moth, 8 Praying Mantis
Hendon Aquatics, 18 Loggerhead Turtle, 2 Moray Eel, 6 Sea Snake
Henwood, C., 8 Dwarf Hamster
Higgins, Mr C., 2 Common Toad
Hill, Mr K., 1 Pekin Robin, 1 Japanese White Eye
Houghton, Mr C., 1 Red-legged Tarantula
Howard, Mrs B. M., 1 Spur-thighed Tortoise
Howletts Zoo, Canterbury, 1 Anaconda
Jupp, Mr J. R. & Gladwell, Mr C. J., Desert Scorpions
Keeling, Mr C. H., 14 coiled snail, 2 leaf beetle, 9 tortoise beetle, 3 ground beetle, 4 desert beetle (*Blaps* sp.), 9 desert beetle (*Tenebrion* sp.), 1 web spider, 1 hunting spider
King, Mr A. D., 6 Fire Salamander
King, Master Carl, Stick-insects
King, Mr G. W., 2 Albino Axolotl
Lassman, Mrs M., 1 Patagonian Conure
Lewis, Mr K. E., 1 Nile Monitor
Lowe, Mr R. T., 1 Brindled House Gecko
Mansfield, Mr D. J., 1 Roseate Cockatoo
Marks, Mrs J., 1 Starling
Matlock Bath Aquarium, 2 Hawk-billed Turtle
McFarlane, Mrs M., 1 Greater Plated Lizard
McGhan, Mr, 1 Boa Constrictor
McGugan, Mr & Mrs S., 1 Senegal Bushbaby
Memory, Mr M., 1 Indian Rock Python
Metropolitan Police, 1 John's Sand Boa, 1 Egyptian Tree Locust
Micklethwait, Mr, 1 Eastern Rosella, 2 Orange-cheeked Waxbill, 2 Cut-throat Finch
Ministry of Agriculture, Fisheries and Food, 6 Grass Carp
Moore, Mr J. W., 2 Giant Gourami, 1 Albino Clarias Catfish, 1 Clarias Catfish, 1 Black Shark, 1 Snakehead, 1 Electric Catfish, 1 Piranha
Moore, Mr S., 6 Forest Scorpion
Mounteney, Mrs T. H., 2 Bat Fish
Myers, Mr J., 1 crab spider
Newmark, Messrs J. & G., and Millais, Mr Corin, 1 katydid, 1 ghost crab, 1 click beetle, 5 long-horn beetle, 1 wingless wasp, 2 bird-eating spider, 1 hunting spider, 1 orb-web spider, 5 Indian Moon Moth
Newton, Miss D. R., 3 Clawed Frog
Nicholls, Mr M. C., 1 Golden-fronted Leafbird
Norfolk Wildlife Park, 1 Grey Seal
Pantrini, Mr G., 1 Sterlet
Parrott, Mr M., 1 Savannah Monitor
Peking Zoo, 3 Chinese Alligator
Pheasant Trust, The, 2 Elliot's Pheasant
Pollock, Mr Stephen, 7 bird-eating spider, 1 wandering spider, 1 ground Mygale, 1 polydesmid millipede, 4 short-horn Grasshopper
Priestman, Mr D. A., 2 Boa Constrictor
Riceman, Miss K., 1 Albino Axolotl
Riley, Mr & Mrs M., 1 Roseate Cockatoo
Rochester Row Police Station, 1 Garter Snake
Rotterdam Zoo, 2 White Woodpecker
Rowan, Dr Peter, 2 Giant Tortoise
Rowlands, Mr Derek, 1 Polka Dot Panther Fish
Royal Parks, The (St. James's), 4 Carolina Duck, 5 Shelduck, 4 Gadwall
R.S.P.C.A., 1 millipede, 1 crab spider, 1 praying mantis, 1 Red-legged Tarantula, 1 European Pond Terrapin, 3 Large-headed Terrapin, 1 Diced Water Snake, 1 Canary-winged Parrakeet
Sacher, Mrs M., 2 Barnacle Goose
Sage, Mr C., 1 Nepal Hill Mynah
Saranum Museum, Chinese Oak Silk Moth larvae
Saunders, Mrs B., 1 Masked Weaver
Semain, Master G., 1 Garter Snake
Shields, Mr T. D., 2 Cat Shark
Smith, Miss D., 1 Mediterranean Spur-thighed Tortoise
Stimpson, Mrs C. A., 1 Plum-headed Parrakeet
Stirling, Messrs Justin & Dalton, 7 millipede
Sugden, Dr E. C., 3 European Pond Terrapin
Tasmanian National Parks and Wildlife Service, 2 Tasmanian Devil
Thoroughgood, Miss J., 1 Tokay, 2 Leopard Gecko, 1 Flap-necked Chameleon, 2 Russell's Sand Boa
Tugwell, Miss W., 1 Mynah
Unilever Research Laboratories, 29 Wattled Starling
Usher, Mrs U. J., Stick-insects
Usill, Mr D., 1 Californian King Snake
Varney, Mr F. C., 1 Giant Gourami, 1 Cichlid, 2 *Tilapia mossambica*
Webster, Mr G., 1 Stehlin's Lizard
Wells, Miss J., 1 Nepal Hill Mynah
West, Mrs C., 1 Jackdaw
Wilde, Mrs A., 1 Hermann's Tortoise, 1 Marginated Tortoise
Willis, Miss Antonio, 1 Tarantula spider
Wilson, Mr M. S., 1 Golden Carp
Woodall, Mr, 1 Monitor Lizard
Wright, Miss A., 1 desert scorpion
Young, Mr & Mrs D., 1 Short-eared Owl, 1 Eider, 1 Rock Dove, 1 Skylark
Young, Mr R. H., 4 cockroach

WHIPSNADE PARK

Eames, Mrs J., 1 Lady Amherst's × Golden Pheasant
Francis, Miss S., 1 Welsh Pony (Cream variety)
Jacob, Mr J., 1 Mallard
Rooney, Mrs A., 1 Canada Goose
Taylor, Mr S., 1 Golden Pheasant

APPENDIX 6

Donations to The Zoological Record Fund

	£
American Museum of Natural History	224.60
British Museum of Natural History	1,450.00
Conchological Society of Great Britain and Ireland	2.00
Entomological Society of Alberta	10.16
Malacological Society of London	2.10
Royal Entomological Society	12.50
Society of Systematic Zoology	137.13
Society for the Study of Amphibians and Reptiles	44.97
	£1,883.46

Meetings during 1980

Scientific Meetings at 5.00 pm

Tuesday, 12th February
Tuesday, 11th March
Tuesday, 8th April
Tuesday, 13th May
Tuesday, 10th June
Tuesday, 14th October
Tuesday, 11th November
Tuesday, 9th December

Symposia

Thursday and Friday, 27th and 28th March: 'Vertebrate locomotion' (to be held in association with the Anatomical Society).

Friday and Saturday, 21st and 22nd November: 'Telemetric studies of vertebrates' (to be held in association with The Mammal Society and the Institution of Electronic and Radio Engineers).

Financial Accounts

Scientific Activities–INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st DECEMBER 1979

	INSTITUTE OF ZOOLOGY				OTHER SCIENTIFIC AND EDUCATIONAL ACTIVITIES							
	Department of Veterinary Science	Wellcome Laboratories	Nuffield Laboratories	Total	Education Scheme and Young Zoologists' Club	Library	Journal, Transactions and Symposia	International Zoo Yearbook	Zoological Record and Nomenclator	Other Expenditure	Total (incl. Institute of Zoology)	Total 1978
EXPENDITURE	£	£	£	£	£	£	£	£	£	£	£	£
Salaries	86,209	92,835	242,074	421,118	43,260	26,878	10,819	14,664	194,666	14,720	726,125	594,900
Paper and printing	—	—	—	—	3,323	—	31,753	15,608	88,669	—	139,353	126,068
Other direct materials and services	18,811	28,974	77,828	125,613	—	21,625	—	4,312	59,296	3,865	214,711	203,682
Equipment	6,434	36,130	26,182	68,746	2,030	—	—	—	—	—	70,776	20,532
Fuel, light and other overheads	—	18,595	41,536	60,131	7,011	—	2,702	—	19,459	—	89,303	80,026
	111,454	176,534	387,620	675,608	55,624	48,503	45,274	34,584	362,090	18,585	1,240,268	1,025,208
INCOME												
Fees received	7,367	—	—	7,367	—	—	—	—	—	—	7,367	2,496
Scientific Fund: Investment Income	—	36,895	—	36,895	—	—	—	—	—	—	36,895	26,776
Grants: specific research projects	—	65,673	164,602	230,275	—	—	—	—	—	—	230,275	183,229
Wolfson Foundation grant	—	—	39,000	39,000	—	—	—	—	—	—	39,000	39,000
A.B.R.C. Contribution	18,600	29,450	64,700	112,750	—	—	—	—	—	—	112,750	75,000
Donations	2,640	—	1,604	4,244	—	—	—	—	—	—	4,244	2,644
Education visits and club fees	—	—	—	—	43,051	—	—	—	—	—	43,051	37,797
Sale of publications	—	—	—	—	—	—	51,999	36,284	324,854	—	413,137	302,051
	28,607	132,018	269,906	430,531	43,051	—	51,999	36,284	324,854	—	886,719	668,993
	—	—	—	—	—	—	(6,725)*	(1,700)†	37,236†	—	28,811	98,682
EXPENDITURE MET BY SOCIETY	82,847	44,516	117,714	245,077	12,573	48,503	—	—	—	18,585	324,738	257,533
	111,454	176,534	387,620	675,608	55,624	48,503	45,274	34,584	362,090	18,585	1,240,268	1,025,208

Notes:

* Surplus arising from the Society's equal division of income and of production expenditure in the joint publishing operation with Academic Press Inc.

† Deficit (Surplus) transferred to Publication Funds

Income and Expenditure Account for the year ended 31st December 1979

1978		INCOME	1979	
£	£		£	£
51,181		Members' subscriptions and entrance fees	69,256	
9,580		*Less* transferred to publications	10,785	
———	41,601		———	58,471
		Interest and dividends		
58,061		General (after allocation to Funds)	89,412	
8,744		Net income from De Arroyave Fund (note 10)	9,751	
57		Income from Davis Fund (note 11)	57	
———	66,862		———	99,220
		Scientific (see page 47 for detailed income)		
329,145		Institute of Zoology – total income	430,531	
37,797		Education scheme and Young Zoologists' Club	43,051	
63,902		Journal, Transactions and Symposia	51,999	
17,065		International Zoo Yearbook	36,284	
221,084		Zoological Record and Nomenclator	324,854	
———	668,993		———	886,719
	118,496	Publications Funds – Transfer of excess of Expenditure over receipts to the Fund		35,536
		Regent's Park		
1,941,698		Admission of visitors to Gardens	2,090,030	
85,030		Admission of visitors to Aquarium	81,274	
222,008		Catering and retail services – net receipts (note 12)	126,133	
2,391		Animals	599	
26,949		All other receipts	25,912	
———	2,278,076		———	2,323,948
		Whipsnade Park		
356,886		Admission of visitors to Park	401,514	
59,960		Admission of cars to Park	55,947	
14,071		Car parks – parking fees	17,223	
19,470		Catering and retail services – net receipts (note 12)	17,972	
58,711		Animals	12,733	
6,579		All other receipts	8,147	
———	515,677		———	513,536
	—	Deficit for year transferred to General Reserve (note 6)		211,452
	£3,689,705			£4,128,882

1978		EXPENDITURE			1979
£	£		£	£	£
	233,924	General administration			257,371
	150,000	Allotment to Major Repairs and Renewals Fund (note 7)			115,000
	3,535	Interest on overdraft			5,207
		Pensions			
8,182		Payments to pensioners		28,335	
99,146		Contributions to Trustees of Pension Fund		141,234	
	107,328				169,569
		Scientific (see page 47 for detailed expenditure)			
506,113		Institute of Zoology – total expenditure		675,608	
46,736		Education scheme and Young Zoologists' Club		55,624	
43,927		Library		48,503	
44,088		Journal, Transactions and Symposia		45,274	
28,610		International Zoo Yearbook		34,584	
339,580		Zoological Record and Nomenclator		362,090	
16,154		Other expenditure		18,585	
	1,025,208				1,240,268
		Regent's Park			
		Zoological Gardens			
21,623		Rates and insurance	23,501		
614,775		Salaries	729,450		
141,511		Provisions	170,906		
192,812		Fuel, light, water, transport	246,747		
58,496		Miscellaneous	66,556		
				1,237,160	
		Works			
195,892		General maintenance		288,390	
134,193		Heating main replacement		—	
46,094		Gardening		57,344	
31,202		Advertising		64,582	
14,565		Purchase of animals		10,542	
	1,451,163				1,658,018
		Whipsnade Park			
		Zoological Park			
13,101		Rates and insurance	7,249		
245,331		Salaries	289,904		
94,948		Provisions	120,487		
60,067		Fuel, light, water, transport	67,917		
27,708		Miscellaneous	35,369		
				520,926	
76,905		Works		96,432	
21,981		Farm, gardens and forestry		23,277	
14,314		Advertising		33,994	
15,782		Purchase of animals		8,820	
	570,137				683,449
	60,000	Transfer to Rebuilding Account Deficit (note 9)			—
	55,000	Transfer to General Reserve (note 6)			—
—					
		Balance			
	33,410	Surplus for the year			—
	£3,689,705				£4,128,882

Balance Sheet at 31st December 1979

1978			1979	
£	£		£	£
	318,632	Sundry creditors and receipts in advance		453,353
	91	Heer Bequest		91
	8,837	Fantham Bequest (note 1)		10,192
	360,559	Scientific Fund (note 2)		343,679
	19,928	Composition Fund		20,707
	1,829	Staff Benevolent Fund (note 4)		1,278
		Reserves		
419,870		General Reserve (note 6)	298,209	
397,820		Major Repairs and Renewals Fund (note 7)	412,455	
100,000		Pensions Contributions Reserve	100,000	
	917,690			810,664
	33,410	Income and Expenditure Account		—
	£1,660,976			£1,639,964

For the notes which form part of these accounts see page 52.

Report of the Auditors

ON THE ACCOUNTS OF THE ZOOLOGICAL SOCIETY OF LONDON

In accordance with the provisions of Byelaw 33 we report that we have examined the Books and Accounts of the Society for the year ended 31st December 1979, and have found them to be in order. Having received all the information and explanations we have required, we are of the opinion that the attached Balance Sheet, the accompanying Income and Expenditure Account and Notes show a true and fair view of the position as shown by the books of the Society. We have verified the Investments and the Cash Balances.

NORTON KEEN & CO *Chartered Accountants*
Knightway House, 20 Soho Square, London, W1V 6QJ
25th February, 1980

1978			1979	
£	£		£	£
113,213		Freehold Property at cost, less sales	113,213	
113,213		Less General Purposes Account (Depreciation Reserve) (note 5)	113,213	
	—			—
		Stocks (note 8)		
1,000		Scientific publications (nominal valuation)	1,000	
15,233		Guides, books, etc.	28,468	
42,867		Catering Departments – provisions, etc.	45,768	
	59,100			75,236
	196,609	Sundry debtors and payments in advance		249,012
	894,105	Investments and deposits at cost (market value £957,126)		939,782
	379,654	Bank Balances—Current and Deposit Accounts		242,961
	8,320	Cash in hand		8,330
	34,081	Rebuilding Account (note 9)		—
	89,107	Publications Funds (note 3)		124,643
	£1,660,976			£1,639,964

BUXTON
Treasurer

Notes on the Accounts

31st December 1979

1. FANTHAM BEQUEST

	£	£
Balance at 1st January		8,837
Investment income		630
Profit on sale of investments		724
Balance at 31st December		£10,192

2. SCIENTIFIC FUND

Balance at 1st January:		360,559
Less:		
Loss on sale of investments	9,494	
Equipment expenditure	7,386	
		16,880
Balance at 31st December		£343,679

3. PUBLICATIONS FUNDS:

Balances at 1st January:		
Zoological Record Fund	75,115 *Dr*	
Neave Lloyd Fund	13,992 *Dr*	
International Zoo Yearbook	—	
		89,107 *Dr*
Sales and donations		361,138
		272,031
Less: Publication and distribution costs		396,674
Balances at 31st December:		
Zoological Record Fund	104,190 *Dr*	
Neave Lloyd Fund	22,153 *Dr*	
International Zoo Yearbook	1,700 *Cr*	
		£124,643 *Dr*

No allowance has been made for future costs estimated at £143,000 chargeable to advance sales received.

4. STAFF BENEVOLENT FUND

Balance at 1st January	1,413	
G. J. Ashby Memorial Fund	416	
		1,829
Allocation of investment income		122
		1,951
Less: Grants		673
Balance at 31st December	833	
G. J. Ashby Memorial Fund	445	
		£1,278

5. GENERAL PURPOSES ACCOUNT (Depreciation Reserve)

Balance at 31st December	£113,213

6. GENERAL RESERVE

Balance at 1st January		419,870
Fees of Deceased Compounders		186
Profit on sale of investments		56,195
		476,251
Income and Expenditure account:		
Balance at 1st January	33,410	
Deficit for year	(211,452)	
		178,042
Balance at 31st December		£298,209

7. MAJOR REPAIRS AND RENEWALS FUND

Balance at 1st January	397,820
Allocation of investment income	19,890
From: Income and Expenditure Account	115,000
Rebuilding Account	10,359
	543,069
Less Expenditure	130,614
Balance at 31st December	£412,455

8. STOCKS

No values are included for animals; plant, vehicles, fittings and furniture; library; farm, and garden stocks.

9. REBUILDING ACCOUNT

Balance at 1st January		34,081 *Dr*
Donations and Grants		47,177
		13,096
Less:		
New Works	2,737	
Transfer to Major Repairs and Renewals Fund	10,359	
		13,096
Balance at 31st December		£Nil

10. DE ARROYAVE FUND

The Capital of the Fund is held by the Official Custodian for Charities. The Income from the Fund was £9,799.

11. DAVIS FUND

The Capital of the Fund is held in trust by the Society but is not included in the Balance Sheet.

12. CATERING AND RETAIL SERVICES

The figures of net income include Concession Fees and Covenanted Profits from Zoo Restaurants Limited and its subsidiary company, Zoo Enterprises Limited, as follows:

	Zoo Restaurants	Zoo Enterprises	
	£	£	£
Regent's Park	25,652	96,430	122,082
Whipsnade Park	2,833	23,761	26,594
	£28,485	£120,191	£148,676